Control and Prevention of Malaria (CAP-Malaria)

Cambodia

Annual Progress Report

(October 1, 2014 to September 30, 2015)

November 2015

Prepared by the CAP-Malaria Team

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ACRONYMS

ACT	Artemisinin Combination Therapy
ANC	Ante Natal Care
AOP	Annual Operational Plan
ARM	Artemisinin Resistant Malaria
BCC	Behavior Change Communication
BMP	Border Malaria Post
CAP-M	Control and Prevention of Malaria Project
CAP-Malaria	Control and Prevention of Malaria Project
CIF	Case Investigation Form
CNM	National Malaria Center
CMS	Central Medical Stores
DOT	Directly Observed Therapy
EDAT	Early Diagnosis and Prompt Treatment
FY	Fiscal Year
GF	Global Fund for AIDS, Tuberculosis, and Malaria
HC	Health Center
HE	Health Education
HF	Health Facility
HH	Household
HP	Health Post
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Nets (includes both LLIN and LLIHN)
LLIN	Long Lasting Insecticidal Net
LLIHN	Long Lasting Insecticidal Hammock Net
LOA	Letter of Agreement
M&E	Monitoring and Evaluation
MDR	Multi-Drug Resistance
MMP	Mobile and Migrant Population
MMW	Migrant Malaria Worker
MOH	Ministry of Health
MOP	Malaria Operations Plan
NGO	Non-Government Organization
NTG	National Treatment Guidelines
OD	Operational District
Pf	*Plasmodium Falciparum*
Pv	*Plasmodium Vivax*
PMix	*Plasmodium Mix (more than one type of Plasmodium)*
PHD	Provincial Health Department
PHO	Provincial Health Office
PMI	President's Malaria Initiative
Pro-TWGH	Provincial Technical Working Group for Health
PPM	Public Private Mix
PQ	Primaquine
QA	Quality Assurance
RDT	Rapid Diagnostic Test
RDMA	Regional Development Mission for Asia
RDQA	Routine Data Quality Assessment
RH	Referral Hospital

RIG	Regional Office of the Inspector General (United States Government)
SI	Strategic Information
SOP	Standard Operating Procedure
UNOPS	United Nations Office for Project Services
URC	University Research Co, LLC.
USAID	United States Agency for International Development
USG	United States Government
VMW	Village Malaria Worker
WHO	World Health Organization

ACRONYMS OF TARGET PROVINCES AND ODs:

BLG	Banlung
BTB	Battambang
MDK	Mondulkiri
MRS	Maung Russey
OMC	Oddar Meanchey
PLN	Pailin
PPT	Poipet
PST	Pursat
RTK	Ratanakiri
SMR	Sen Monorum
SNK	Sotnikum
SPL	Sampov Loun
SPM	Sampov Meas
SRG	Samrong
SRP	Siem Reap
STT	Stung Treng
TMP	Thmar Puok

EXECUTIVE SUMMARY

Over the past 4 years, the incidence of malaria in Cambodia has decreased from 7.98 cases per 1,000 population in 2011 to 3.60 in 2014 (CNM Epidemiology unit). In CAP-Malaria target areas (11 Operational Districts or ODs), the malaria incidence decreased from 22.31 cases per 1,000 in 2011 to 11.43 in 2014. Malaria mortality countrywide also decreased over the last 4 years. Ninety-three, 45, and 12 deaths were recorded in 2011, 2012, and 2013 respectively. These declines represent reductions of 40%, 51%, and 74% respectively, from each previous year. The number of deaths due to malaria increased to 18 in 2014 for reasons that are not fully clear. Starting in April 2015, an increase in the number of malaria cases was seen, most noticeably in Kratie, Kampong Speu, Mondulkiri, Pursat and Stung Treng provinces. In response to the situation, CAP-Malaria conducted an investigation and appropriate response activities in 2 ODs (Sampovmeas of Pursat and Senmonorum of Mondulkiri) in collaboration with the National Malaria Center (CNM) and other partners/stakeholders. The reasons for this increase may be due to several factors including increased population movement for land resettlement, wood cutting, and other related income generating activities in the affected areas. Additionally, it should be noted that a funding delay outside of CAP-Malaria's control related to contracting issues between the Global Fund for AIDS, Tuberculosis, and Malaria (GF) continues to hamper malaria services delivery and have not, at the time of the writing of this report, been resolved.

The USAID-funded Control and Prevention of Malaria Project (CAP-Malaria or CAP-M), implemented by University Research Co., LLC (URC), strives for systematic prevention and control of malaria and with a focus on artemisinin resistant malaria (ARM) in Cambodia, Thailand, and Burma. In Cambodia, the project provides technical and financial support to strengthen national, provincial and local level efforts to control and eliminate malaria.

During year 4 (October 1, 2014-September 30, 2015), CAP-malaria Cambodia supported the CNM and line programs at provincial/district and community levels to prevent and control malaria in 11 operational districts (ODs) in 9 provinces (6 provinces bordering Thailand and 3 provinces bordering Vietnam and Laos). The project's main beneficiaries are mobile and migrant populations (MMP) and residents of the endemic areas, estimated to number 1,611,000. CAP-Malaria works closely with its counterparts and partners, especially with village malaria workers (VMWs)/ mobile malaria workers (MMWs) and rural health facilities (HFs) to provide comprehensive malaria services to its target population, including malaria prevention and health education, early diagnosis and prompt treatment both at health facility and community levels. There are 588 VMWs/MMWs and 196 HFs (HP, HC & RH) in endemic areas supported by CAP-Malaria. CAP-Malaria also supports and strengthens capacity building, program management, and use of strategic information for decision making and for guiding effective interventions and monitoring. Last but not least, CAP-Malaria is setting the groundwork for transition from control and prevention toward pre-elimination/elimination in one OD in Western Cambodia (Sampov Loun OD).

Key accomplishments during project year 4 (October 1, 2014 to September 30, 2015):

- 122,811 LLIN/LLIHN (94,584 LLINs & 28,227 LLHINs), procured with USG support, were distributed by CAP-Malaria;
- 939 health workers were trained on malaria case management with ACT;
- 988 health workers were trained on malaria laboratory diagnosis (939 on RDT use and 49 on basic microscopy);
- 16,025 RDTs purchased with USG funds were distributed to health facilities and VMWs;
- 143,917 visits to households (HHs) and 22,538 visits to farms were conducted by VMWs to monitor LLINs coverage and use (47,842 HHs and 6,105 farms were targeted in each quarter);
- 93,276 MMPs were educated on malaria prevention and appropriate health-seeking behavior;
- 198 health workers were trained on logistics and malaria commodity management;
- 4,895 malaria cases were confirmed and treated by CAP-Malaria- supported VMW/MMWs among the total 14,221 malaria cases treated by VMW/MMWs in the CAP-Malaria target areas

- 11,825 malaria cases were confirmed and treated by health facility (HF) staff in CAP-Malaria supported areas;
- 167 private providers from the public private mix (PPM) activities had been supported by CAP-Malaria in 3 ODs. In Zone 2, 3,684 suspected malaria cases were tested, of which 2,036 were confirmed and treated by PPs; in zone 1, 464 suspected malaria cases were tested and referred to HFs/VMW, of which 239 malaria cases were treated by HFs/VMWs.
- 2,486 Day-0 cases were enrolled in 13 surveillance sites, of which only 9 cases remained positive on Day-3. Of these 9 cases, 7 were followed up till Day-7 and only 4 till Day-28.
- 11 meetings of provincial/district special working groups for malaria elimination took place;
- Routine Data Quality Assessment (RDQA) sessions were conducted at OD/HFs;
- On average, 98 HFs received quarterly technical supervision from OD;
- Over 300 VMW/MMWs received monthly technical supervision from HF;
- Through report sharing, CAP-Malaria results were incorporated into CNM's annual report 2014;
- CAP-Malaria achievements were presented at the national malaria conference in February 2015;
- CAP Malaria project activities were shared at national level at the malaria sub-technical working group on a bi-monthly basis;
- CAP Malaria project activities at OD and provincial levels were shared in monthly OD meetings and monthly provincial technical working group for health (Pro-TWGH);
- CAP-Malaria project activities and results were shared at quarterly PMI partner meetings;
- Pre-Malaria Operational Plan team (MOP 16) and pre-elimination experts visited CAP-Malaria in February 2015 to plan for pre-elimination activities in Cambodia;
- A basic essential package for malaria pre-elimination was approved on 20 May, 2015 and fully initiated in July 2015. Of 102 malaria cases reported between July and the end of September 2015, 78 cases were captured using the "1-3-7" approach. Of these cases 13 were found to be indigenous and 65 imported. As staff become more familiar with the approach and with its related data collection tools, and with ongoing supervision, CAP-Malaria expects that almost 100% of cases will be notified and investigated as per protocol;
- Outbreak response activities were conducted in collaboration with CNM in Sampov Meas (SPM) and Sen Monorum (SMR) ODs;
- CAP-Malaria supported 2 ODs (SPM and SMR) to conduct VMW meetings due to delayed funding from the GF.

Key challenges during year 4 (October 1, 2014 to September 30, 2015):

- Approval of the FY 14 work plan was delayed until January 2015 slowing down CAP-Malaria's pace of implementation;
- It continues to be very challenging to reach MMPs such as forest goers and cross-border populations;
- Late arrival (6 months) of artemisinin combination therapy (ACT) strained the project's abilities to ensure drug coverage, despite repeated attempts to redistribute supplies from areas with surplus stocks to those facing impending or actual stock-outs (this situation has now been resolved);
- The new National Treatment Guidelines (NTGs) developed in 2014 could not be fully implemented due to the national malaria control program's reluctance to implement primaquine use due to evidence from the safety study not being finalized. The ASMQ fixed dose combination recommended for Pf malaria treatment in Tier 1 has not yet been applied due to drug unavailability.

- The absence of a "blue print model" for malaria pre-elimination in the context of ARM led the development and approval of the pre-elimination work plan being delayed; the work plan was approved in May 2015 and implementation commenced immediately afterwards;
- Challenges in recruiting a suitably qualified strategic information (SI) consultant led to delayed field implementation of the review and improvement of project SI as recommended by the fall 2014 report of the Regional Office of the Inspector General (RIG). However, this situation was rectified and a consultant was recruited and has made contributions as planned;
- The delay in the finalization of the agreement between the Royal Government of Cambodia and the GF's primary recipient (the United Nations Office for Project Services- or UNOPS) resulted in delay or postponement of implementation of some activities, such as monthly VMW meetings, meaning in urgent cases CAP-Malaria had to intervene and provide funding for selected activities as a stop-gap measure. When this delay will be rectified is unclear and outside CAP-Malaria's control;
- Population movement, especially among MMPs makes it difficult to complete 28 days treatment follow up in all target areas, including SPL.

Priorities for the last year of the project, Year 5 (October 1, 2015-September 30, 2016):

- As per the approved exit strategy, CAP-Malaria will exit from 6 lower priority ODs and concentrate on the remaining 5 priority ODs (see sections 2.1 and 2.2);
- Strengthening and continuation of normal control activities;
- Continue to build the capacity (laboratory, case investigation and treatment follow-up, supply chain management, data collection and analysis,) of local counterparts in the 5 remaining ODs;
- Continue making up for time lost to implement planned activities such as case management training, progress review workshops and results dissemination results to stakeholders;
- Adapt, revise, and implement the pre-elimination plan based on discussions with and recommendations received from MOP and USAID's Regional Development Mission for Asia's (RDMA);
- Implement the approved exit strategy;
- Implement key recommendations from the external project gender analysis;
- Document the lessons learned by the project so that an evidence-base is available to all stakeholders;
- Work with GSSH to strengthening the basic essential package of activities in SPL.

1. INTRODUCTION

The USAID-funded Control and Prevention of Malaria Project (CAP-Malaria or CAP-M), implemented by University Research Co., LLC (URC), strives for systematic prevention and control of malaria and with a focus on artemisinin resistant malaria (ARM) in Cambodia, Thailand, and Burma.

In Cambodia, the project provides technical and financial support to strengthen national, provincial and local level efforts for malaria and ARM containment programs. The objectives of the project are to 1) develop and scale-up cost-effective vector control interventions to prevent the transmission of malaria; 2) improve the quality and effectiveness of diagnosis and treatment of malaria at the community and health facility levels; 3) reduce management bottlenecks of the Cambodian National Malaria Control Program (CNM) and local institutions to implement and monitor malaria control activities; and 4) support the establishment and maintenance of strategic information for malaria control.

During project year 4 (October 1, 2014-September 30, 2015), CAP-MALARIA Cambodia has continued to support the CNM and the line programs at provincial/district and community levels to prevent and control malaria in 11 operational districts (ODs) in 9 provinces (6 provinces bordering Thailand and 3 provinces bordering Vietnam and Laos).

The project's main beneficiaries are mobile and migrant populations (MMP) and residents of the endemic areas, estimated to number 1,611,000.

CAP-Malaria works closely with its counterparts and partners, especially with VMW/MMWs and rural HFs to provide comprehensive malaria services to its target population, including malaria prevention and health education, early diagnosis and prompt treatment both at health facility and community levels. There are 588 VMWs/MMWs and 196 HFs- comprising health posts (HP), health centers (HC), and referral hospitals (RH) in endemic areas supported by CAP-Malaria.

In addition, CAP-Malaria supports and strengthens capacity building, program management, and use of strategic information for decision making and for guiding effective interventions and monitoring.

Last but not least, CAP-Malaria is setting the groundwork for transition from control and prevention toward pre-elimination/elimination in Sampov Loun OD in Western Cambodia (See section 2.1.5).

Figure 1: CAP-Malaria Area of Operation

Areas targeted:

- Project Years 1&2 (2012-2013): 10 ODs within 7 provinces
- Project Year 3(2014): 12 ODs within 9 provinces (2 new ODs)
- Project Year 4(2015): 11 ODs within 9 provinces (phase out of 1 OD)
- Project Year 5 (2016): 5 ODs within 4 provinces (phase out of 6 ODs as per exit plan)

Population covered by year 4:

- Total population: 2,203,500
- Risk population[1]: 1,611,000 (including mobile and migrant population)

Table 1: Targeted ODs/HFs/Villages

ODs	RH/HCs/HPs			Villages			VMW/MMW	
	Total	Non-Endemic	Endemic	Total	Endemic	Non-Endemic	GF-CNM	CAP-M
Battambang	29	16	13	239	112	127	50	112
Maung Russey	15	9	6	174	52	122	67	0
Sampov Loun	11	0	11	127	127	0	0	168
Sampov Meas	34	18	16	355	119	236	48	47
Poipet	18	8	10	137	51	86	39	68
Samrong	32	0	32	361	291	70	120	172
Pailin	7	0	7	114	114	0	273	0
Sotnikum	27	12	15	306	98	208	102	16
Senmonorum	26	0	26	147	147	0	260	0
Banlung	48	0	48	257	257	0	270	0
Stung Treng	12	0	12	133	133	0	242	5
11 ODs	**259**	**63**	**196**	**2,350**	**1,501**	**849**	**1,471**	**588**

Malaria situation:

The number of confirmed malaria cases in Cambodia was halved from 112,057 cases in 2011 to 44,748 cases in 2013 before increasing to 56,271 cases in 2014. The most recent data available for 2015 suggests that another increase will be seen this year. Malaria mortality also decreased from 96 in 2011 to 18 deaths in 2014 (figure 2). As this report is written (October 2015) there have been 6 malaria deaths in 2015. Approximately 50% of malaria cases reported were captured by community volunteers.

During the first 6 months of 2015, according to data from MIS/HIS, the number of malaria cases increased by 25% (from 18,672 to 23,274) compared to the same period in 2014 (table 2). Based on findings from the outbreak response analysis (see section 2.1.2), there have been movements of new settlers to areas that are highly endemic. This movement d due to land clearance for agricultural farming or other commercial purposes as well as for permanent settlement. Many newcomers come from non-endemic areas meaning they do not have the knowledge and skills to effectively prevent malaria transmission.

Figure *2*. Number of malaria treated cases and deaths by year in Cambodia (2001-2014)

[1] Defined by CNM as the number of residents living within 2 kilometers of a forest

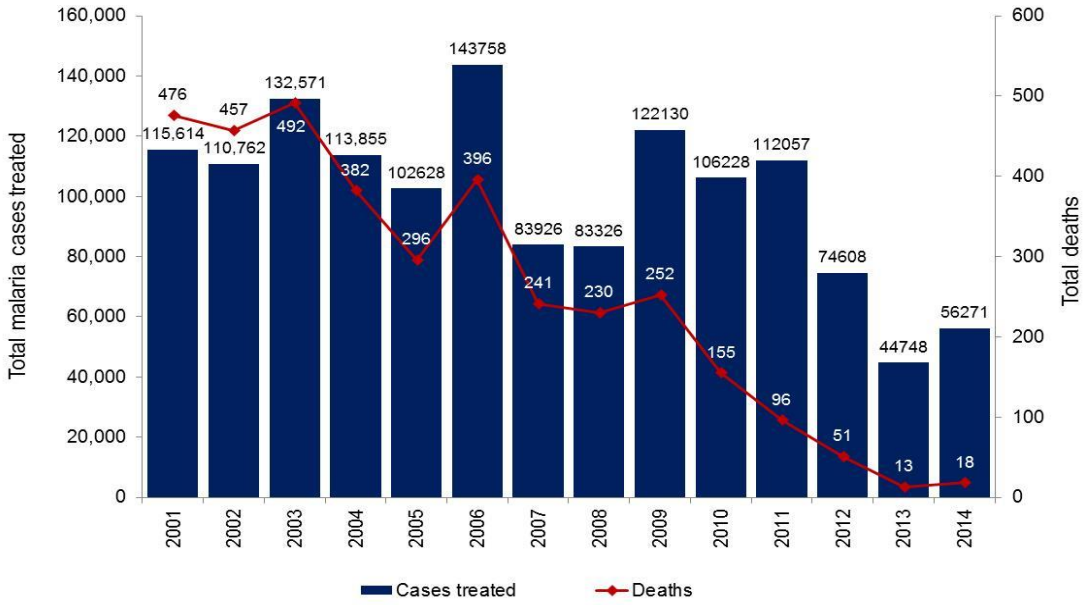
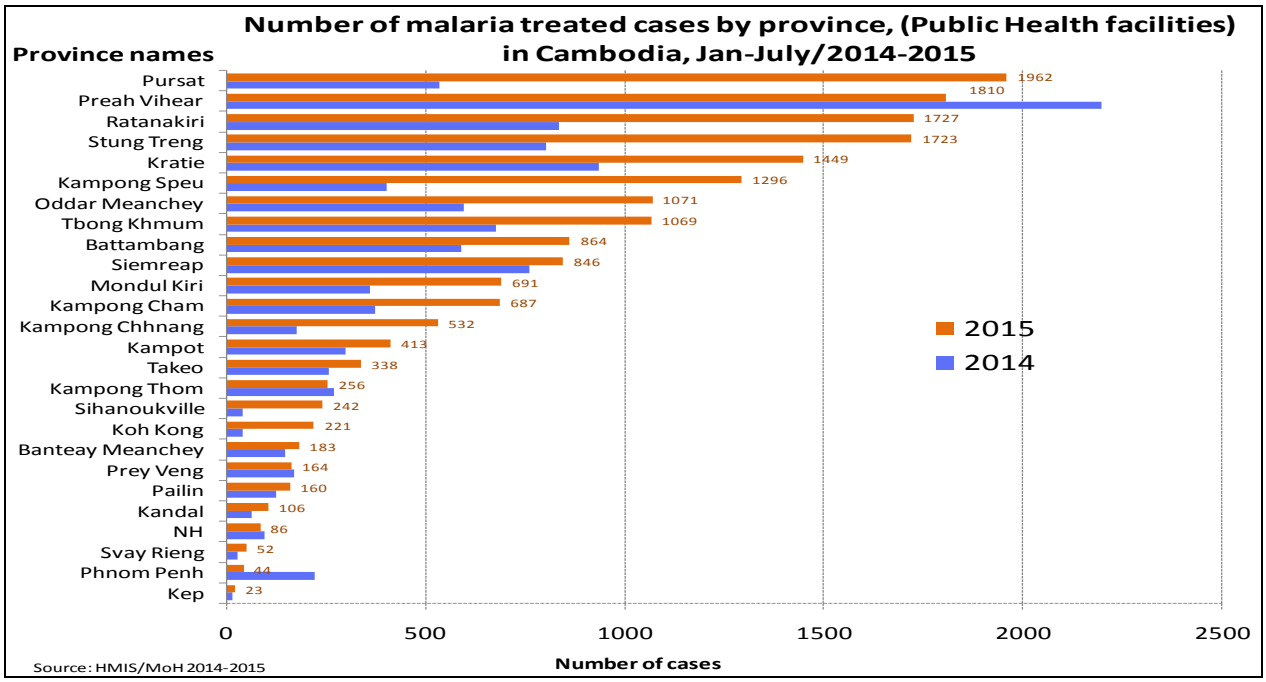


Table 2: Malaria species, Jan-June, 2014-2015, Cambodia

	Jan to June, 2015			
	PF (%)	PV (%)	Mix (%)	Total
Public Health Facilities	5966 (43.35)	6117 (44.45)	1678 (12.19)	**13761**
VMW	2772 (29.14)	4654 (48.92)	2087 (21.94)	**9513**
Total	**8738 (37.54)**	**10771 (46.28)**	**3765 (16.18)**	**23274**

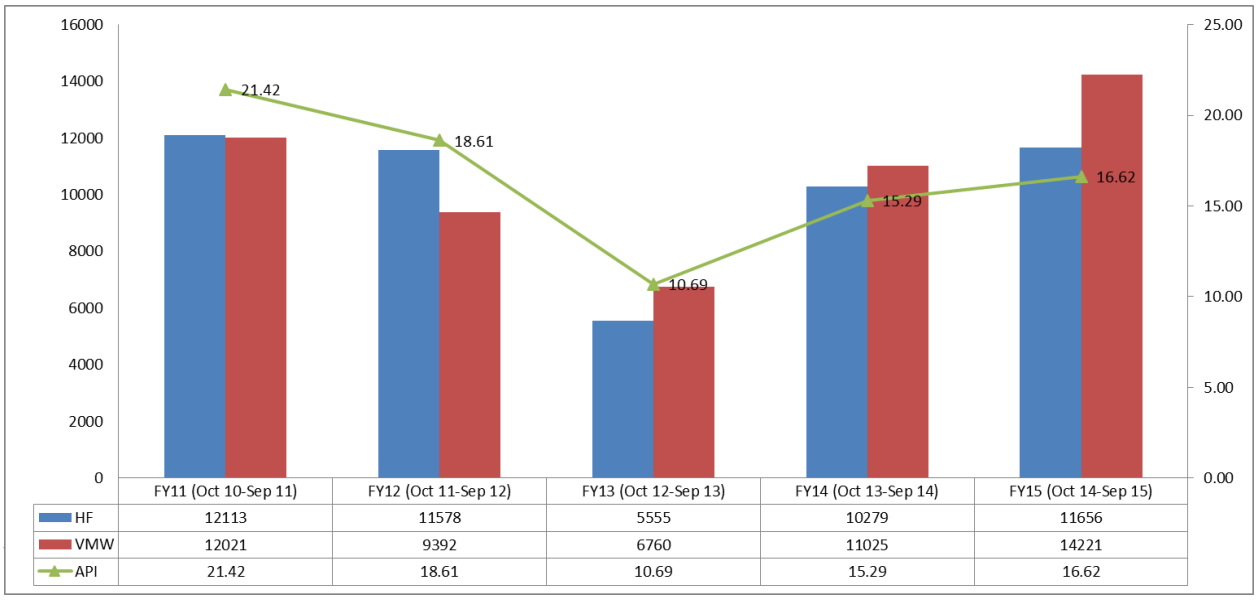
	Jan to June, 2014			
	PF (%)	PV (%)	Mix (%)	Total
Public Health Facilities	2725 (30.07)	3644 (40.21)	2694 (29.73)	**9063**
VMW	1230 (12.80)	5737 (59.70)	2642 (27.50)	**9609**
Total	**3955 (21.18)**	**9381 (50.24)**	**5336 (28.58)**	**18672**

**Source: DPHI/MOH 2014-2015 (extracted on 26 Jul 2015)*



Data Source: CNM/MOH

Figure 3. Treated malaria cases by HFs & VMWs in CAP-Malaria target ODs: Oct 2010-Sept 2015



	FY11 (Oct 10-Sep 11)	FY12 (Oct 11-Sep 12)	FY13 (Oct 12-Sep 13)	FY14 (Oct 13-Sep 14)	FY15 (Oct 14-Sep 15)
HF	12113	11578	5555	10279	11656
VMW	12021	9392	6760	11025	14221
API	21.42	18.61	10.69	15.29	16.62

2. PROJECT ACHIEVEMENT BY OD

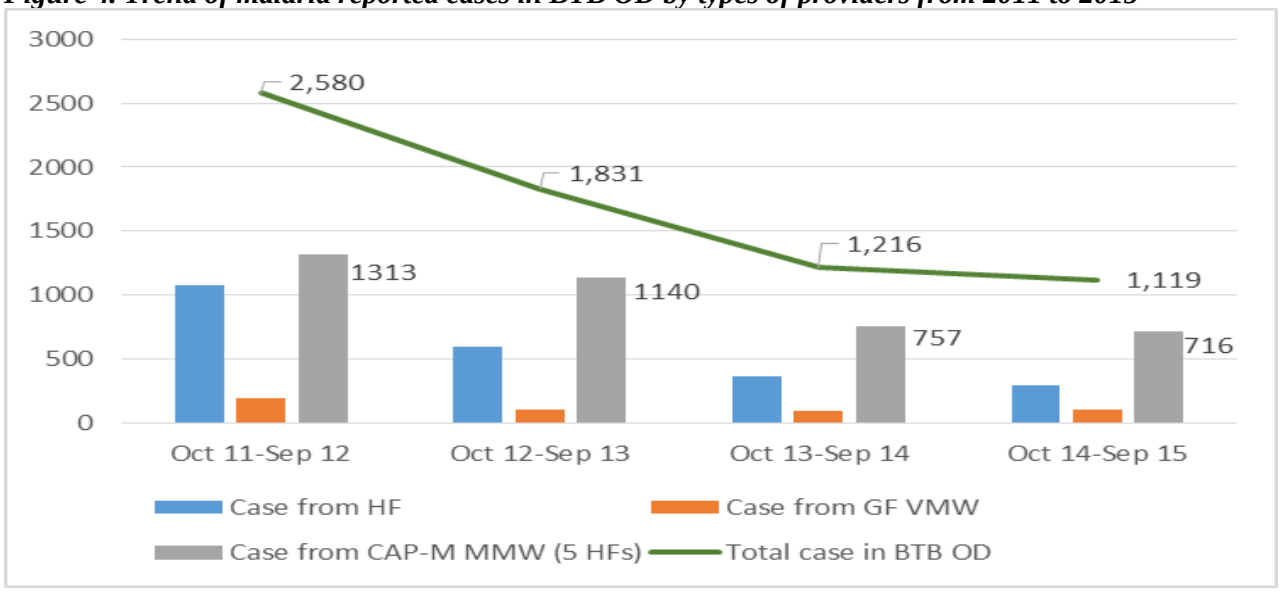
2.1 Progress on 5 ODs that will be continued in Year 5

2.1.1 Battambang Operational Health District (BTB OD)

BTB OD of Battambang province (Tier 1) is located in Western Cambodia bordering Thailand in the west, Pursat province (Tier 1) in the south and east and Thmorkol OD in the north, and in 2015 has a to tal population of 386,324. Of these, 113,610 are at risk population.

Overall malaria cases in BTB OD declined sharply between 2011 and 2014 and slightly decreased in 2015 (figure 4). This trend analysis shows that community volunteers contribute enormously to malaria case detection and treatment.

Figure 4. Trend of malaria reported cases in BTB OD by types of providers from 2011 to 2015



CAP-Malaria supports VMWs in Samlot District, one of the OD's 5 administrative districts, with a 2015 population of 39,000 inhabitants in 52 villages under the catchment area of 7 HFs.

CAP-Malaria year 4 achievements in BTB OD

In 5 HCs and 2 HPs that have CAP-Malaria supported VMWs:

- All 123 *Pf*/*Pmix* malaria cases were treated with 3 days directly observed therapy (DOT).

- In Tasanh HC, of 42 *Pf*/*Pmix* cases detected and followed up on Day-3 by VMWs, 7 of them remained positive and were used as index cases for response activities. 1 case lost follow up on Day-7. Response activities were done for 5 index cases, 127 persons were screened and 3 malaria cases were detected (*Pf:* 1 & *Pv:* 2).
- LLIN monitoring and topping up at households (HHs) and farms was done along with health education, emphasizing interpersonal communication (IPC) to the target population. As part of the activity 26,455 nets (21, 270LLINs/5,185 LLIHNs) were distributed
- 18,269 persons, including 4,475 MMPs, received HE through IPC on net use and correct health seeking behavior. The topping up helps to address the need to provide nets for newcomers from non-endemic areas, and provides opportunities for community volunteers to have contact with high risk populations, giving them appropriate prevention messages, encouraging constant use of LLIN/LLIHNs, promoting correct health seeking behavior as well as detecting malaria cases during their outreach activities.
- CAP-Malaria used training to build the capacity of service providers (VMWs/MMWs and HF staff). During the year, 108 VMW/MMWs and 12 HF staff were trained on simple malaria case management in BTB OD. The project incorporated new malaria testing strategies following the updated NTG into the training sessions to improve early diagnosis among the at-risk population.
- Routine activities such as lab Quality Assurance (QA), VMW/MMWs monthly meetings, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, semi-annual progress review and strategic information dissemination at OD level were continued.

In 5 HCs and RHs that don't have CAP-Malaria supported VMWs, CAP-Malaria supported only training of 12 HF staff on malaria case management and followed-up their performance with technical supervision. Malaria case management in these HFs has been satisfied by the supervisors. In 16 non-endemic HF areas, CAP-Malaria didn't have any activities in this reporting period.

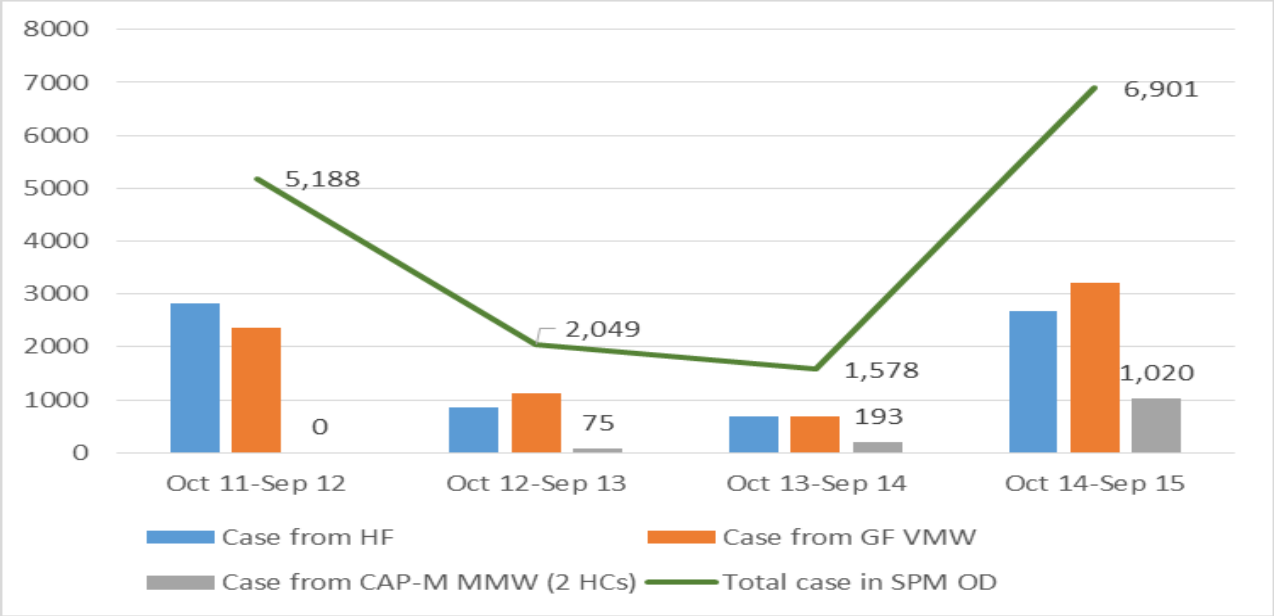
2.1.2 Sampov Meas Operational Health District (SPM OD)

SPM OD of Pursat Province (Tier 1) is located in Western Cambodia, bordering Thailand and Battambang province (Tier 1) in the west, Koh Kong province (Tier 2) in the south, and Kampong Chhnang Province (Tier 2) in the east and the Tonle Sap Lake in the north.

The SPM OD had a population of 290,556 in 2015. CAP-Malaria has MMWs in two HCs with 21,321 inhabitants. 47 MMWs were recruited in late 2012 from 15 villages and 16 farms.

Overall malaria cases numbers in SPM OD fluctuated between 2011 and 2014 and increased sharply in 2015 (figure 5). This trend may be related to a reported high influx of population in 2015 as land has been cleared for large agricultural farms. The job opportunities created both the land clearing itself and the subsequent large scale farming requiring laborers, especially in Veal Veng and Kravanh districts, near the Cardamom Mountain Chain, have attracted populations who are not knowledgeable on malaria and who are not equipped to prevent and treat it. CAP-Malaria and counterparts have been monitoring the situation in the affected areas and the trend of malaria cases has declined somewhat tin August and September. CAP-Malaria will continue to monitor this trend and will respond as appropriate.

Figure 5: Trend of malaria reported cases in SPM OD by type of providers- 2011 to 2015



In 2 HCs that have CAP-Malaria supported VMWs/MMWs and 2 supported surveillance sites:

- All 575 *Pf*/*Pmix* malaria cases confirmed were treated with 3 days DOT.
- In Pramouy and Thmordar HC *Pf* Day -3(+) surveillance sites, of 1,165 *Pf*/*Pmix* detected/enrolled by VMWs 1,160 were followed up on Day-3, 3 of them remained positive and were used as index cases for response activities. The 3 cases were followed up till Day-7 and only 1 followed up till day-28.
- Response activities found that from the 3 index cases, 75 persons were screened and 5 cases detected and treated (Pmix: 2 and Pv: 3). The community also received health education on how malaria signs and symptoms and how it was important to promptly see a VMW or HF should any of these appear. An LLIN assessment and topping up was also conducted.
- The capacity of service providers (VMWs/MMWs and HF staff) was built through training; 35 VMW/MMWs and 7 HF staff were trained on simple malaria case management. The project incorporated new malaria testing strategies into the training sessions to improve early diagnosis among the at-risk population.
- Routine activities such as lab QA, VMW/MMWs monthly meetings, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination at OD level were continued.
- Using strategic information generated by the project and CNM, a response was mounted in July 2015 to a spike in case numbers in SPM OD. The box below summarizes the joint response of CNM and CAP-Malaria.

Outbreak Response in SPM OD- whole July 2015

- Preparation meeting for response was conducted at PHD among stakeholders under the leadership the PHD director
- Investigations were done in 2 HCs and 23 villages
- 5, 225 HHs were visited
- 3,250 LLIN/LLIHN were distributed
- 6,686 people received IPC on key prevention and treatment messages and additional people were reached via PSA made through mobile loud speakers
- 467 tests were done, resulting in 191 cases being identified
- 25 patient were interviewed using cases investigation forms
- ACTs were transported from Phnom Penh to SPM and further to the HFs, VMWs/MMWs
- July, August, and September monthly CNM VMW meetings were supported by CAP-Malaria (no incentives paid)
- Jointly developed draft SOP for malaria outbreak
- Result sharing was conducted in August 2015 at CNM

Having seen a sharp increase in case numbers in SPM OD (as well as in other areas), CAP-Malaria conducted additional analysis, and provided support to CNM to conduct further investigations and response activities in July 2015. The findings were shared and strategic interventions adopted on supplies of malaria commodities and preventive interventions. The routine malaria commodity supply chain from the central medical store (CMS) to the end users was inadequate to meet the needs of this unusual increase of cases so an alternative supply strategy was put in place. The supplies from CMS are based on average monthly consumption, which doesn't reflect that some services delivery points (VMWs) don't use ACT/RDTs and that some that didn't have enough on hand. The local health authority had decided to keep ACT at HFs and ordered VMWs to refer patients as a temporary solution. The buffer stock of malaria commodities (RDT/ACT) at CNM is crucial to ensure adequate emergency supplies to end users.

Coincidently, CNM received ACTs from *Medecins Sans Frontieres*, preventing the situation from deteriorating even more, following which CAP-Malaria facilitated the delivery of supplies to VMWs & HFs.

Three potential reasons for the rapid increase in cases in 2015 include that as described earlier, the OD had many new settlers (most from non-endemic areas), and that mobile populations stayed in the area longer than would usually be the case due to ongoing employment opportunities. CNM's net distribution activities took place later than expected, and there is a potential that some cases are ACT resistant.

Finally as regards SPM OD, CAP-Malaria supported training for 12 HFs staff in endemic areas on malaria case management and followed this up with technical supervision.

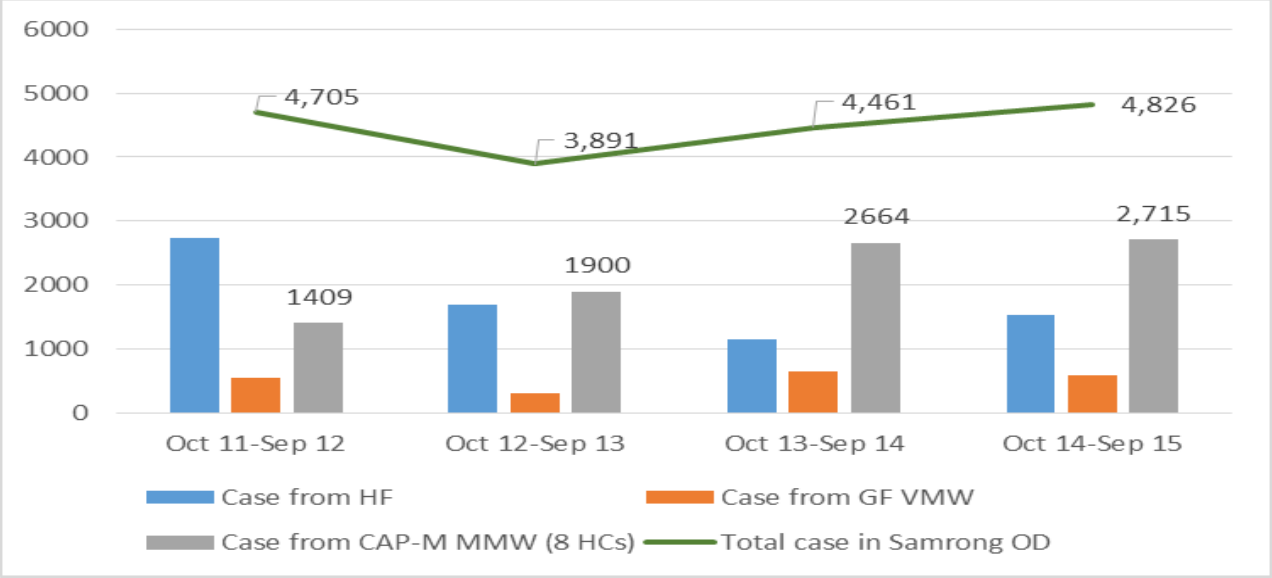
In 16 non-endemic HF areas, CAP-Malaria supported training (and technical supervision) to 18 HF staff on simple malaria case management.

2.1.3 Samrong Operational Health District (SRG OD)

SRG OD of Oddar Meanchey province (Tier 1) is located in the north of Cambodia, bordering with Thailand in the north, Preah Vihear (Tier 1) in the east, Banteay Meanchey (Tier 2) in the west and Siem Reap (Tier 2) in the south. Population figures for the OD are 239,371 in 2015. CAP-Malaria has VMWs in 8 HCs with 98,537 inhabitants in 2015.

Overall malaria cases in SRG OD varied between 2011 to 2014 and increased slightly in 2015 (figure 6). This trend could possibly be the result of the noted influx of population during 2015 from other areas to work at agricultural farms and to enter the Dangrek Mountain Chain to cut wood for sale or to cross the border into Thailand to look for work. In response to this epidemiological change, CAP-Malaria plans to streamline its strategic intervention base on malaria cases to use HF catchment areas as the new unit of analysis rather than use OD and the entire project area, as in the past.

Figure 6: Trend of malaria reported cases in SRG OD by types of providers from 2012 to 2015



CAP-Malaria year 4 achievements in SRG OD:

In 8 HCs that have CAP-Malaria supported VMWs:

- All 1,795 *Pf*/*Pmix* malaria cases confirmed were treated with 3 days DOT.
- In Anlong Veng *Pf* Day-3(+) surveillance sites, 131 *Pf*/*Pmix* detected by VMWs were followed up on Day-3, 1 of them remained positive and was further followed up till Day-7 with the result negative parasite.
- The capacity of service providers (VMWs/MMWs and HF staff) was built through training; 161 VMW/MMWs and 15 HF staff were trained on simple malaria case management. The project incorporated new malaria testing strategies into the training sessions to improve early diagnosis among the at-risk population.
- LLIN monitoring and topping up at households (HHs) and farms was done along with health education, emphasizing interpersonal communication (IPC) to the target population. As part of the activity 27,735 ITNs (11,585LLINs and 9,150 LLIHNs) were distributed. Topping up was required to address the needs of newcomers to the area. The activity also provides a first contact between VMWs and new arrivals, setting the groundwork should the latter have signs/symptoms of malaria in the future.
- Routine activities such as lab QA, VMW/MMWs monthly meetings, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination at OD level were also continued.

CAP-Malaria supported technical supervision and training to 16 staff in 16 HFs in non-endemic areas on malaria case management.

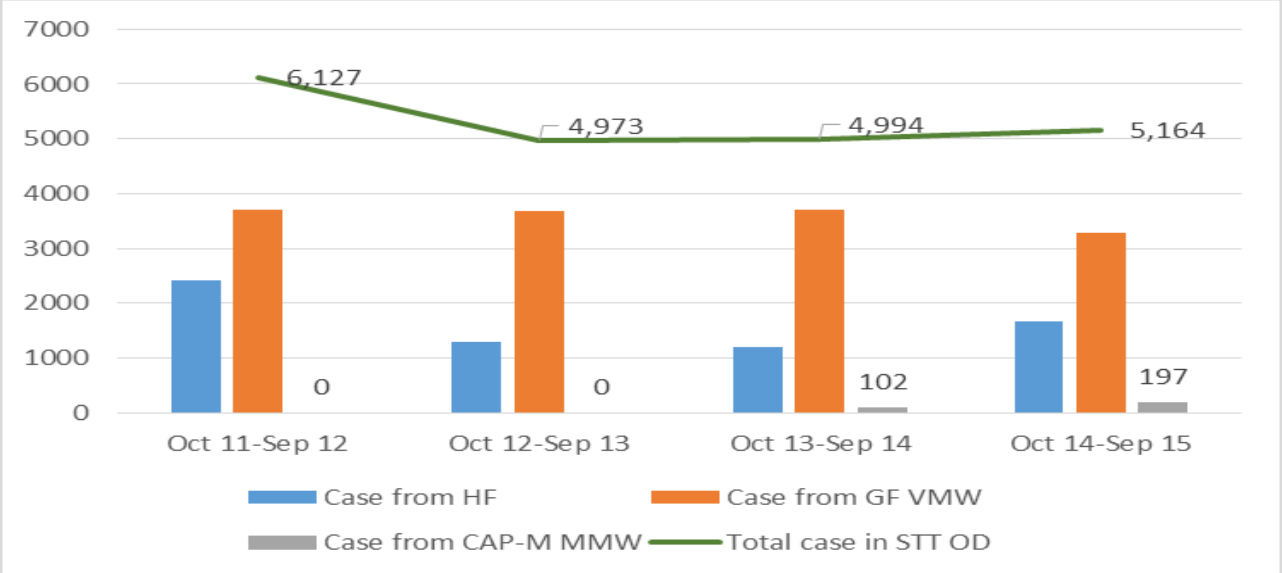
In SRG's other 24 HCs in endemic areas that don't have CAP-Malaria supported VMWs, CAP-Malaria supported only technical supervision and lab QA.

2.1.4 Stung Treng Operational Health District (STT OD)

STT OD of Stung Treng province (Tier 2) is located in the North Eastern Cambodia bordering with Laos in the North, Preah Vihear province (Tier 1) in the West, Kratie province (Tier 1) in the South and Ratanakiri (Tier 2) in the East. The OD has the population of 147,081 in 2015.

Overall malaria cases in STT OD had been decreased during the period 2012 to 2013 and slightly increased from 2013 to 2015 (figure 7).

Figure 7: Trend of malaria reported cases in STT OD by types of providers from 2012 to 2015



CAP-Malaria started the project in STT OD in Q3 of Year3. The project has supported *Pf* Day-3(+) surveillance by community in 3 HCs (Siem Pang, Preah Romkel HC and Thalaboriwat HC). The 2 latter are located on the West Mekong river band bordering with Laos, Preah Vihear and Kratie provinces, with 27,471 inhabitants in 2015. These 2 surveillance sites were started in October 2014, will be continued in the Year 5. The trend of malaria cases in these two HCs is also increased from 1,138 cases in project year 3 to 1,200 cases in year 4.

CAP-Malaria does not have VMW in any of the 12 HFs in this OD. But CAP-Malaria has supported 5 MMWs who are living in the deep forested area (touch points) under the catchment area of Siem Pang FDH (2 MMWs) and Thalaboriwat HC (2 MMWs).

CAP-Malaria year 4 achievements in STT OD:

In 3 HCs that CAP-Malaria supported *Pf* Day-3(+) surveillance:

- 763 *Pf*/Mix detected by VMWs had been enrolled and only 732 been followed up on Day-3, none of them remained (+).
- CAP-Malaria supported training to 114 VMWs on malaria case management.
- 919 LLINs were distributed to MMPs through outreach activities to workers in the forest.

In all HFs, CAP-Malaria supports routine activities such as lab QA, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination at OD level were continued.

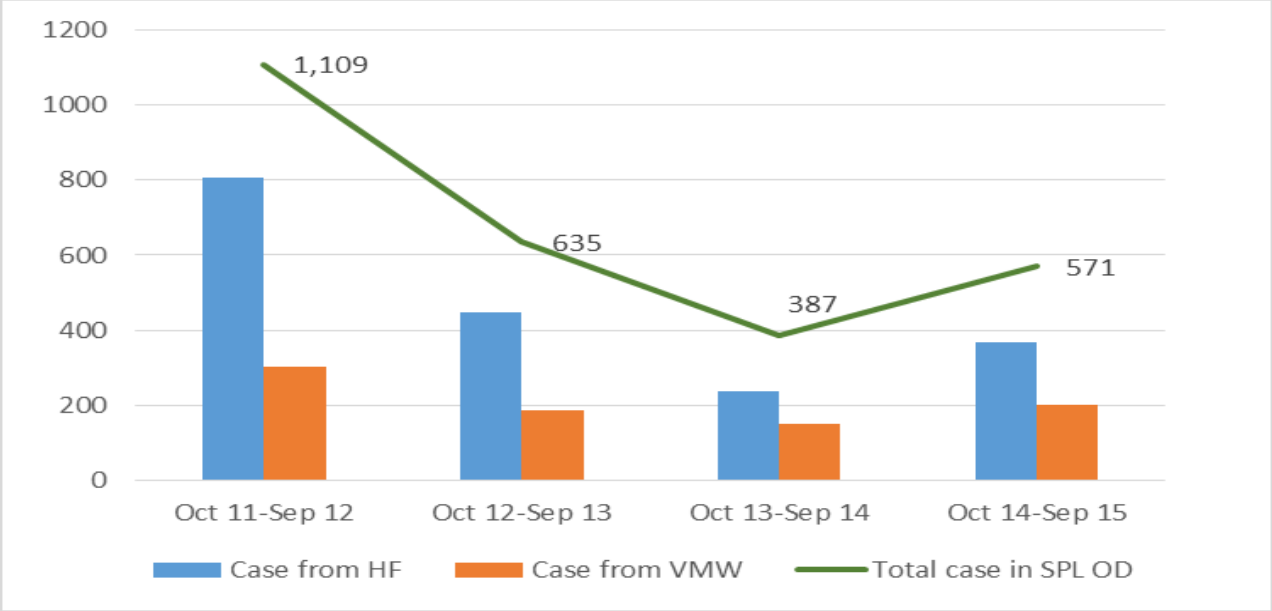
2.1.5 Sampov Loun Operational Health District (SPL OD): The Pre-elimination OD

SPL OD is located in Northwestern Cambodia bordering with Poipet (PPT) OD in the north, Thailand in the west, and Pailin (PLN) OD in the South and Thmorkol OD in the east. The OD has 3 administrative districts (Kamrieng district, Phnom Proek district and Sampov Loun district) with a population of 161,663 in 2015.

SPL is one of the targeted ODs with active CAP-Malaria activities since project inception in November 2011. Of note is that SPL is the only OD where CAP-Malaria supported 168 VMWs in all 10 HCs.

Overall malaria cases in SPL OD had been decreased during the period of 2012 to 2014 and increased in 2015.

Figure 8: Trend of malaria reported cases in SPL OD by types of providers from 2011 to 2015

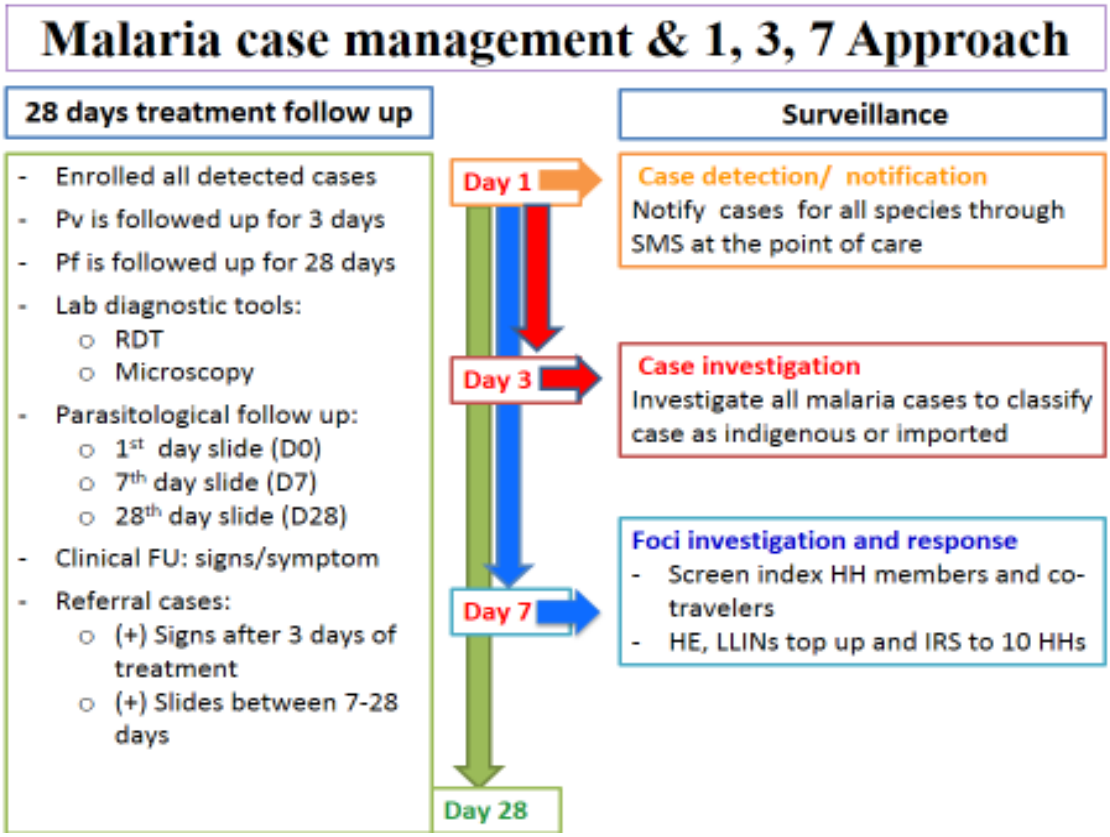


Basic essential package for malaria pre-elimination activities

The SPL work plan with a basic essential package for malaria pre-elimination activities was approved on 20 May 2015 and its official launching was held on 25 June 2015. Pre-elimination activities in SPL OD began in July 2015 and will continue until September 2016. Orientations of the essential package to OD/HF staff and VMWs were conducted in 2nd and 3rd week of July 2015. The special working groups for malaria elimination in each of the 3 administrative districts of SPL OD were established and meeting has been routinely conducted every other month.

The SPL team (OD/HFs/VMWs & CAP-Malaria) follow the 1-3-7 approach and are tracking the progress. The 1-3-7 refers to (1) means malaria case detected will be notified within 1 day or 24 hours, (3) means the case will be investigated within 3 days after detection and (7) means response will be conducted surrounding the investigated case within 7 days after the detection. Case investigation was only fully implemented in Mid-July 2015 after the case investigation form (CIF) was revised together with CNM & WHO, followed by the orientation of OD/HF that was conducted on 13-14 July 2015. The 1-3-7 excel datasheet has been used but the integration into the MIS database is still being designed by CNM & Malaria Consortium (MC).

The case management with 28 days follow up and 1-3-7 approach are summarized below:



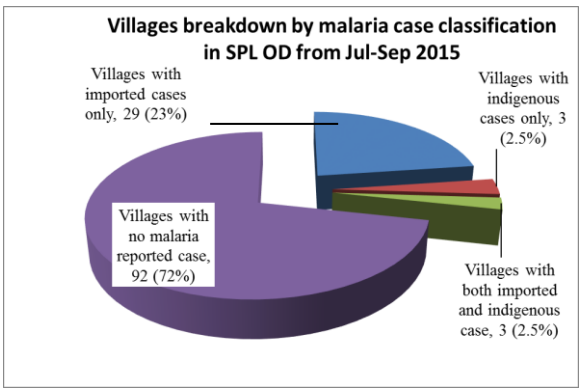
Resources and supported activities:

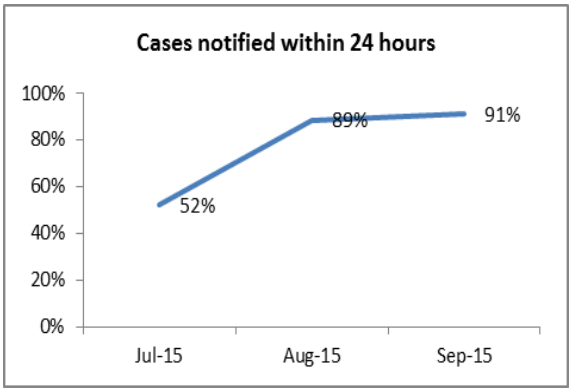
- Deployment of 1 CAP-Malaria coordinator based in each administrative district and led by one team leader based in SPL OD (shared office with OD office). One assistant to team leader is based in SPL OD to help in data entry and M&E activities. One lab specialist recruited in August 2015 stands by in SPL OD to oversee functioning of malaria diagnosis at HCs and RH and the QA system, including supervision, on-the-job training as well as proper recording of laboratory result.
- With new microscopes equipped (6 by CNM/GF and 2 by CAP-malaria) in Q1 of year 4 (Nov-Dec 2014) basic microscopy training was conducted for 20 lab staff (2 lab staff in each of the 10 HCs)
- An assessment of laboratory skills among lab staff of the 10 HFs was conducted in June 2015 aiming to establish a baseline and inform training priorities. Following the assessment refresher training was conducted on malaria microscopy reading for 7 lab staff who found limited performance.

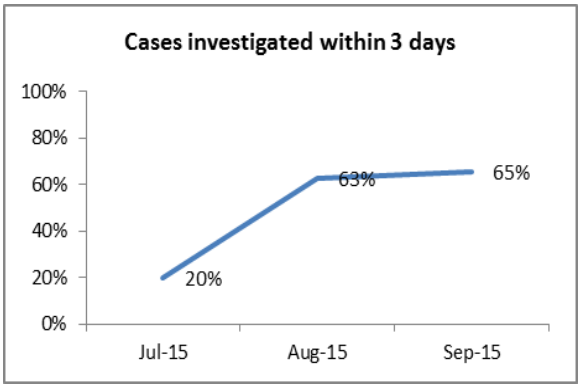
- Microscopy double reading started in July 2015; all slides are read first by a HC lab technician then the slide is sent to the RH via motorcycle drivers who ensure two daily deliveries. At the RH a second reading is done by the RH lab specialist. So far, the system appears to be working with intensive technical support and monitoring, and the next quarterly report will provide more details. CAP-Malaria equipped 1 new microscope to the RH.
- To ensure quality of malaria diagnosis, provincial lab supervisors from Battambang PHD spend bi-weekly mission to SPL OD to support the QA system. In addition, lab expert from CNM is asked by OD/PHD to supervise laboratory system in the OD.
- VMWs and HF staff in SPL OD received training on malaria case management and 28 days treatment follow-up. HF staff were trained on case investigation and leading the response activities.
- The capacity of service providers (VMWs and HF staff) was built through training; 172 VMWs and 32 HF staff were trained on simple malaria case management. The project incorporated new malaria testing strategies into the training sessions to improve early diagnosis among the at-risk population.
- Data collection: on top of the routine data collection (Once a month, data is collected from VMW/HF to OD), the 1-3-7 approach requires daily data collection from VMW to HF and from HF to OD. Database for pre-elimination activities set up at OD level with integration into existing MIS system (Case investigation form, treatment follow up form, response summary report). Real time notification of detected cases have been provided by VMW and HF staff through existing CNM SMS alert system (phone call is used till SMS smoothly functioning).
- Mapping of malaria cases, villages with malaria (indigenous versus imported cases) prepared by M&E team as tool for monitoring the evolution of malaria situation in SPL OD (see annex).

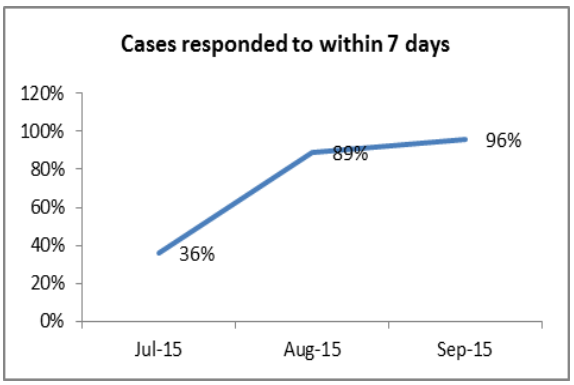
During 1st July- 30th September 2015, the 1-3-7 approach resulted in the following:

- 2,689 malaria suspected were tested; 103 cases of which were confirmed (*Pf/Pmix*: 47 & *Pv*: 56); 93 received DOT.
- Of those confirmed, 83 malaria cases were notified within day 1 (*Pf/Pmix*: 44 and *Pv*: 39) by phone until the SMS notification system was started on 7 September 2015. Phone calling is still recommended until the SMS system is smoothly operating.
- Of these 83 cases, case investigation identified 14 cases as indigenous and 69 as imported.
- Response activities:
    - Screening index household members and co-travelers: from the 83 index cases detected, 312 people were screened between Day-3 and Day-7 and 2 *Pf* cases were detected and treated among index HH members.
    - Surrounding the index households, HE and ITNs topping up: 746 persons received HE through IPC and 2 LLINs distributed.
- The above cases were detected from 35 villages of the total 127 villages in the OD.









For baseline information, during August-September 2015, retrospective case investigation was conducted on malaria cases in SPL OD for the 12 months from July 2014 through June 2015:

- 518 cases were from 101 villages of the total 127 villages in SPL OD
- 247 cases (48%) from 78 villages met for interview
- Of the 78 villages:
    - 8 villages had only indigenous cases,
    - 59 villages had only imported cases and
    - 11 villages had both
- Of the 247 cases interviewed:
    - 18% (45) of cases were indigenous cases
    - 82% (202) of cases were imported cases
    - 49% of cases were among farmers, 49% among workers while 2% were among vendors.

As activities continue, key indicators will be tracked and compared to this baseline.

***Other year 4 activities and achievements in SPL OD**:*

- CAP-Malaria undertook LLIN monitoring and topping-up as needed at HHs and farms, supported health education (IPC) to target population. A total of 23,895 ITNs, (19,595LLINs/4,300 LLIHNs) were distributed.
- Through visit to HHs and farms by VMWs, 50,716 persons (27,655 MMPs) received HE through IPC on net use and proper service seeking behavior. As in other ODs, the topping-up exercise provides an opportunity to ensure new arrivals have nets and are motivated to use them correctly. The net distribution exercise also provides new arrivals with an introduction to the VMWs that can serve them should the need arise.
- Technical supervision has been conducted on quarterly basis from OD to HFs and on monthly basis from HF to VMWs.
- Monthly meeting has been conducted at HF between VMWs and HF staff with/without participation from OD and CAP-Malaria staff.
- Supply and stock monitoring on malaria commodities, especially RDT, ACT and lab materials have been regularly conducted on monthly basis by OD supervisors to HFs and by HF to VMWs with support from CAP-Malaria staff

Challenges:

- It takes time to change the mindset of local stakeholders from malaria control to elimination
- Public holidays and weekends get in the way of 1-3-7 approach among HF/OD staff
- 28 days follow up of Pf/Mix cases is difficult due to the population mobility
- Unavailability of the recommended ACT (ASMQ co-formulated)

Way forward:

- Continue strengthening the implementation of the 1-3-7 approach in a timely manner and make recommendation as more experience is gained
- Dialogue with stakeholders to address the public holidays and weekends
- Advocate with CNM and WHO to speed up the procurement of the ASMQ

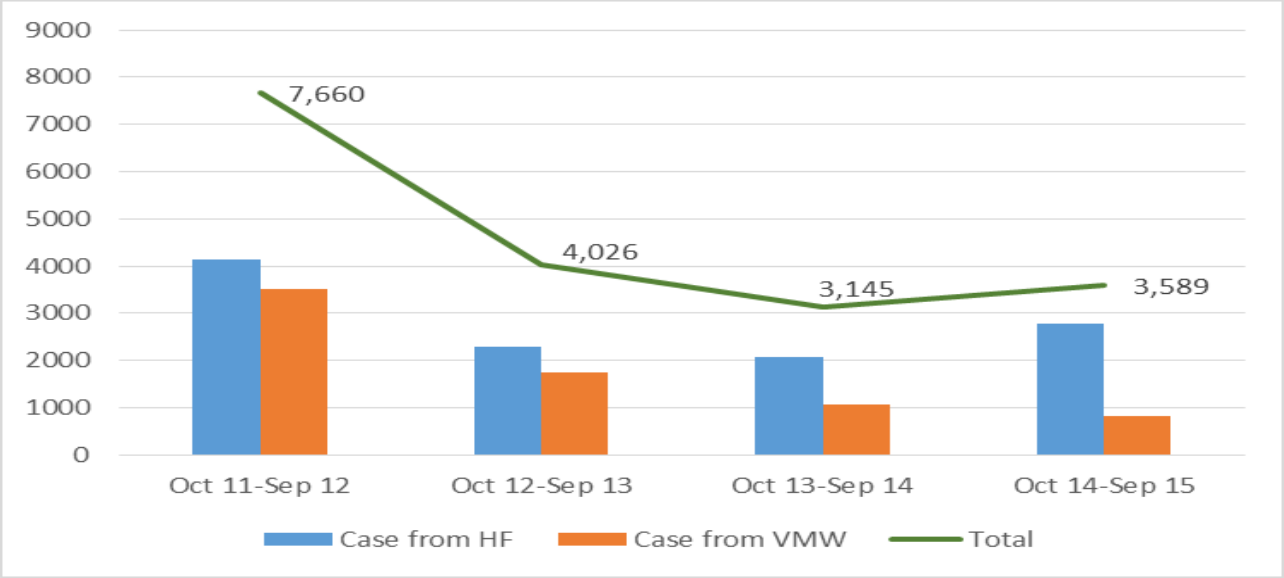
2.2 Progress in 6 ODs that will be exit in Year 5

2.2.1 Banlung Operational Health District (BLG OD)

Banlung OD of Ratanakiri province (Tier 2) is located in Northeastern Cambodia bordering Laos to the North, Stung Treng province (Tier 2) in the west, Mondulkiri (Tier 2) in the south and Vietnam in the east. The OD has the population of 155,664 in 2015.

As seems to be the general trend, after declines between 2011 and 2014, the number of cases in BLG rose in 2015 (see figure 9).

Figure 9: Trend of malaria reported cases in BLG OD by types of providers from 2012 to 2015



CAP-Malaria had expanded its geographical coverage to BLG in project year 3 (Oct 13-Sep 14), started its support for malaria control activities in BLG OD focusing on capacity building and health systems strengthening. The main reasons this OD was selected for work include that it has a large number of MMPs (many of whom cross borders to work), and because it is an area closed to drug resistance area where *Pf* Day-3 surveillance could be monitored. The project has not supported its own VMWs in the OD but has worked with CNM's. In June 2015, as a result of consultations with the donor and in line with the CAP-Malaria exit strategy, CAP-Malaria support for activities in this OD was discontinued, and CNM has taken over responsibility.

CAP-Malaria year 4 achievements in BLG OD:

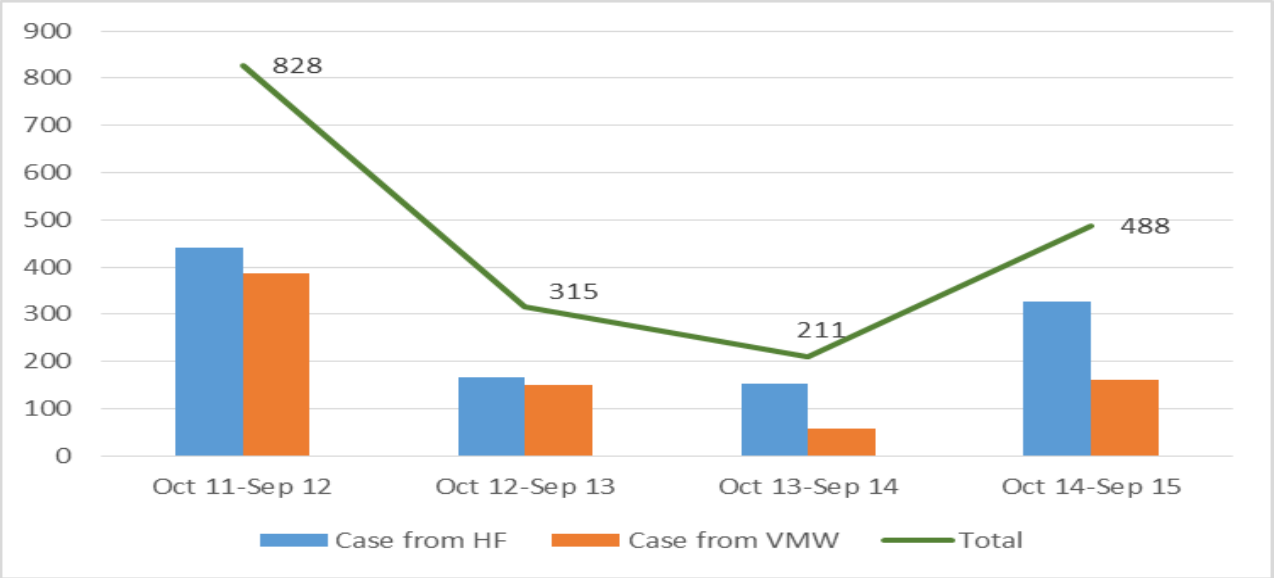
- Supported transport of essential supplies;
- Supported malaria case investigation to identify possible outreach;
- Malaria case management training for 35 HF staff,
- Support for routine activities such as lab QA, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination at OD level.
- 1,391 ITNs (710 LLINs and 681 LLIHNs) were distributed
- CAP-Malaria supported school health programs on malaria education messages through TOT training to 74 teachers in 41 primary schools. Those teachers in turn taught malaria sessions to 1,763 students (810 girls) in grade 4, 5 and 6. Monitoring of teachers' performance has been conducted by district/provincial education officers.
- In addition, CAP-Malaria provide support to commemorate world malaria day and malaria week in 20 villages. The estimated audience reached is 4,694 audience (with about 114 being MMPs). During these activities, 30 malaria cases were detected and treated by the teams. The project also supported 4 community theater sessions on malaria prevention and care seeking behavior which was attended by an estimated 2,400 persons (about half were women).

2.2.2 Mong Russey Operational Health District (MRS OD)

MRS OD is located in Western Cambodia in Battambang Province and borders BTB OD in the west, Sangke OD in the north and Pursat province in the southeast. The OD has a 2015 population of 69,291.

The number of malaria cases decreased between 2012 and 2014 but saw a remarkable increase in 2015 (figure 10). This trend may be related to a reported high influx of population in 2015 to the area.

Figure 10: Trend of malaria reported cases in MRS OD by types of providers from 2012 to 2015



CAP-Malaria started its support to MRS OD at project inception (October, 2011). The project support 1 HC (Preytralach) on *Pf* Day-3(+) surveillance. Due to CNM policy to handed over PPM in this OD to CNM and *Pf* Day-3 (+) is no longer useful (MRS became tier1, previously zone 2), CAP-Malaria decided to exit from this OD by the end of Year 4.

CAP-Malaria year 4 achievements in MRS OD:

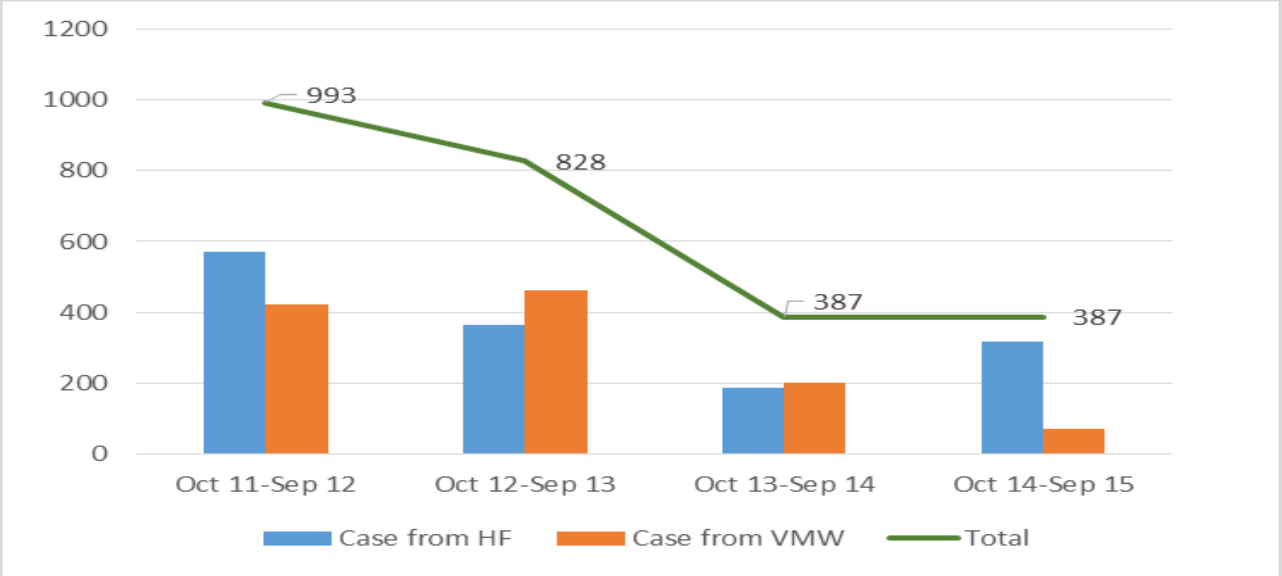
- In Preytralach HC, 166 *Pf/Pmix* cases were detected by VMWs and followed up on Day-3, none of them remained positive.
- The capacity of service providers was built through training; 15 VMW/MMWs and 2 HF staff were trained on simple malaria case management.
- As part of the public private mix (PPM) program, 39 private providers together detected 126 malaria cases from 213 tested.
- Routine activities such as lab QA, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination were done at OD level together with BTB OD for all 6 endemic HFs.
- CAP-Malaria also supported AOP development and monitoring the implementation.

2.2.3 Pailin Operational Health District (Pailin OD)

PLN OD of Pailin province (Tier 1) is located in Northwestern Cambodia bordering SPL OD to the North, Thailand in the west and BTB OD in its south and east. In 2015 the estimated population is 70,486.

The malaria case pattern in PLN shows annual decreases from 2012 to 2014 and at leveled off in 2015.

Figure 11: Trend of malaria reported cases in PLN OD by types of providers from 2012 to 2015



CAP-Malaria started its activities in Pailin in October 2011, but as part of the exit strategy as the project enters its fifth and final year, our support to this OD terminated at the end of September 2015. PPM activities will be taken over by CNM

CAP-Malaria year 4 achievements in PLN OD:

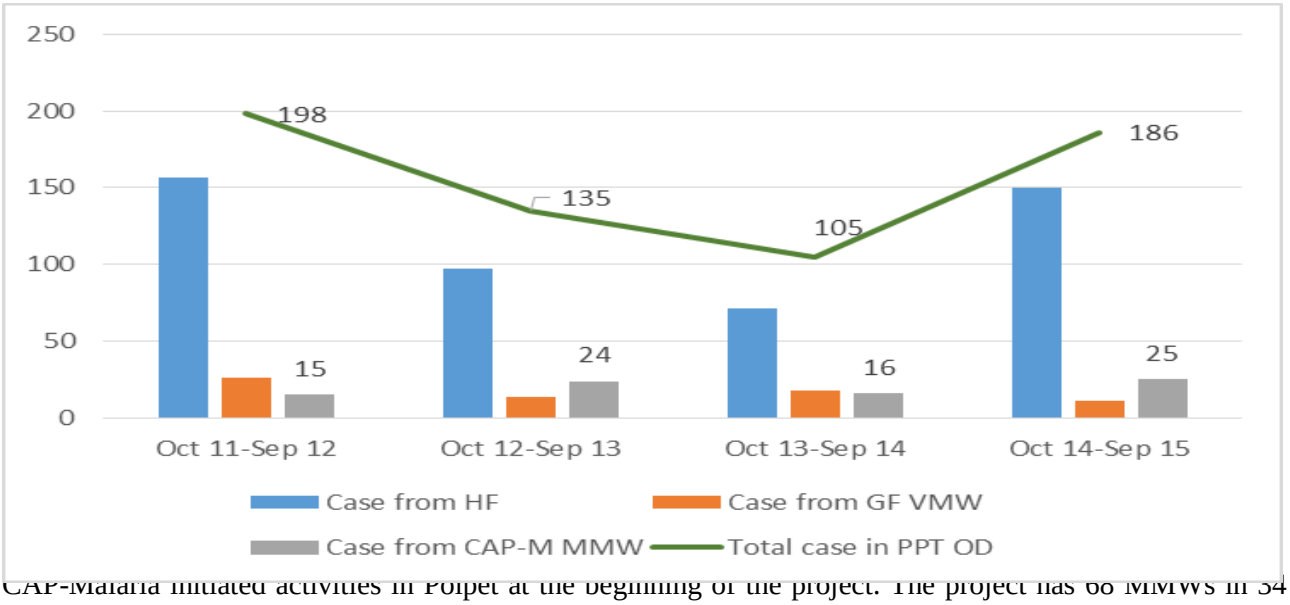
- The capacity of service providers was built through training; 22 HF staff members were trained on simple malaria case management. The project incorporated new malaria testing strategies into the training sessions to improve early diagnosis among the at-risk population.
- 2,418 LLINs were distributed.
- 39 Private Providers (PPs) were involved in the CAP-Malaria supported PPM activities. PPs detected 83 suspected malaria cases and referred these to HFs, 70 of which presented at a HF. At HF, 63 of these 70 were confirmed and treated accordingly.
- In addition, CAP-Malaria supported world malaria day in the province

2.2.4 Poipet Operational Health District (PPT OD)

PPT OD of Banteay Meanchey province (Tier 2) is located in Northwestern Cambodia bordering with Thmor Pouk OD in the north, Thailand in the west, SPL OD in the south and Mongkolborey OD in the east. The OD had the population of 143,962 in 2015.

The number of malaria cases in PPT OD is illustrated in Figure 12 below. As elsewhere in Cambodia, there were declines between 2011 and 2013 followed by increases.

Figure 12: Trend of malaria reported cases in PPT OD by types of providers from 2012 to 2015



CAP-Malaria initiated activities in Poipet at the beginning of the project. The project has 68 MMWs in 34 villages in 6 HCs catchment areas. CAP-Malaria planned to exit from the OD by end of its year 4.

***CAP-Malaria year 4 achievements in PPT OD**:*

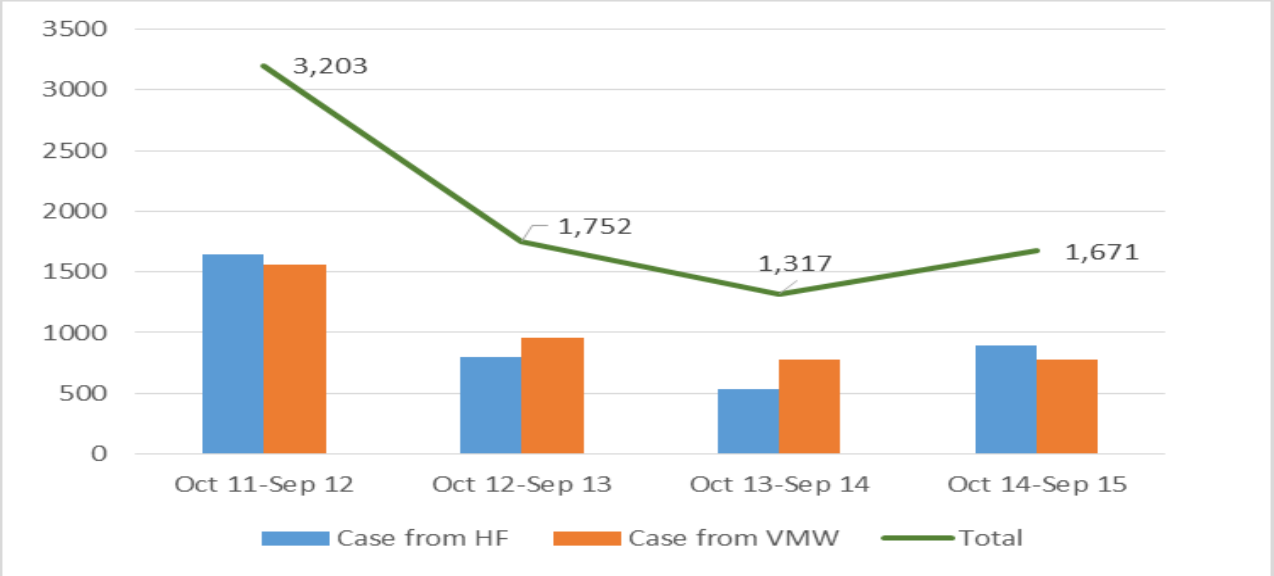
- Case management by CAP-Malaria supported VMW resulted in the detection of 9 *Pf/Pmix* malaria cases, all of which were treated with 3 Days DOT.
- 13 HF staff and 36 VMWs were trained on malaria case management with support from CAP-Malaria
- Routine activities such as lab QA, VMW/MMWs monthly meetings, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination were conducted at OD.
- A lending scheme supported 1 village since 2012 worked through 1,367 farms. In addition, LLIN monitoring and topping up at HHs and farms (combined with health education (IPC)) reached 23,700 persons. Of these ITNs provided, 22,500 were LLINs and 1,200 were LLIHN
- In addition, CAP-Malaria supported world malaria day in the OD

2.2.5 Sen Monorom Operational Health District (SMR OD)

SMR OD of Mondulkiri province is located in Northeastern Cambodia bordering with Ratanakiri province (Tier 2) in the North, Kratie province (Tier 1) in the west, Tbong Khmum province (Tier 2) in the south and Vietnam in the east. The OD has population of 717,203 in 2015.

The number of malaria cases in SMR OD is illustrated in Figure 13 below. As elsewhere in Cambodia, there were declines between 2011 and 2014 followed by increases in 2015.

Figure 13: Trend of malaria reported cases in SMR OD by types of providers from 2012 to 2015



CAP-Malaria started activities in SMR during the last quarter of project year1 (July 2012). The project has not had any VMW/MMW in this OD; rather volunteers in SMR were supported directly by Global Fund. CAP-Malaria supported *Pf* Day-3(+) surveillance in 3 HCs- Keo Seima, Ou Reang and Koh Ngek to complement activities led by other stakeholders. CAP-Malaria exits from the OD by end of its year 4.

CAP-Malaria year 4 achievements in SMR OD:

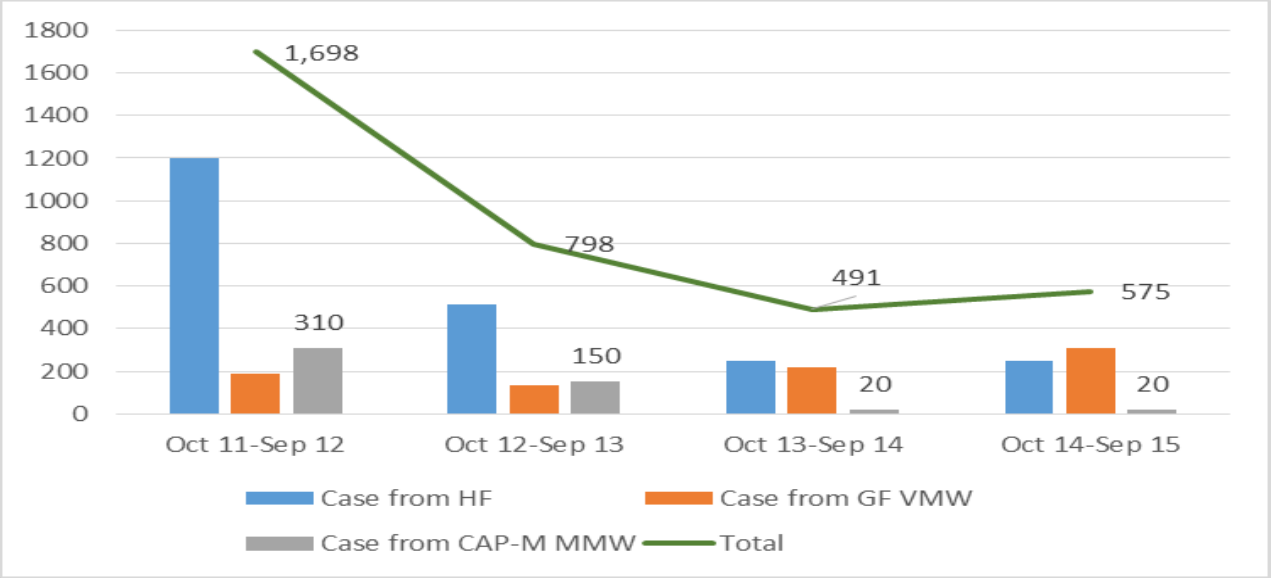
- In 3 surveillance sites, 177 Pf/Pmix cases detected/enrolled by VMWs and 161 were followed up on Day-3, all of them were cured (confirmed negative).
- 109 VMWs were trained on simple malaria case management.
- 2,548 LLINs (1,551 LLINs and 1,007 LLIHNs) were distributed through outreach activities.
- In addition, CAP-Malaria supported world malaria day in the province
- Routine activities such as lab QA, VMW/MMWs monthly meetings, technical supervision, RDQA, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination were conducted at OD.

2.2.6 Sotnikum Operational Health District (SNK OD)

SNK OD of Siem Reap province (Tier 2) is located in the Northwest Cambodia bordering with SRG OD in the north, Siem Reap OD in the west, Preah Vihear and Kampong Tom Provinces (Tier 1) in the east and Tonle Sap Lake in the south. The OD has a population of 147,389 in 2015.

The number of malaria cases in SNK OD is illustrated in Figure 14 below. As elsewhere in Cambodia, there were declines between 2011 and 2013 followed by increases.

Figure 14: Trend of malaria reported cases in SNK OD by types of providers from 2012 to 2015



CAP-Malaria started activities in SNK OD in February, 2012. CAP-Malaria had 10 VMWs/MMWs.

CAP-Malaria supported *Pf* Day-3(+) in Khav HCs in Year 1&2 but stopped this activity in Y 3&4 due to the site having been taken over by CNM as a therapeutic effectiveness study site. CAP-Malaria will exit from the OD in Year 5.

CAP-Malaria year 4 achievements in SNK OD:

- 20 malaria cases detected and treated by CAP-Malaria supported VMWs
- During year 4, 12 HFs staffs were trained on simple malaria case management.
- 8,350 LLINs (6,200 LLINs and 2,150 LLIHNs) were distributed through outreach activities.
- In addition, CAP-Malaria supported world malaria day and malaria week activities in 20 villages reaching an estimated 4,694 persons, of whom 114 were MMPs. During these activities, 30 malaria cases were detected and treated by the teams. Additionally, the project supported 4 community theater sessions on malaria prevention and correct care seeking behavior which was attended by 2,400 villagers (slightly over half were women) and 195 MMPs, comprising 86 women.
- Support for routine activities such as lab QA, VMW/MMWs monthly meetings, RDQA, technical supervision, supply/stock monitoring of RDT & ACT, progress review and strategic information dissemination at OD level was also provided.

3. PROGRAM PERFORMANCE/ACHIEVEMENTS BY STRATEGIC INTERVENTION

3.1 Malaria Prevention

Malaria prevention interventions include LLIN/LLIHN distribution, monitoring of ITN coverage and use and BCC services. BCC promotes awareness and appropriate practices among at-risk populations to prevent transmission of malaria, to seek recommended health care services and to avoid using of counterfeit and sub-standard drugs.

CAP-Malaria implemented all activities that are planned in year 4 of the projects. The results of these activities from October 2014 through September 2015 are reported in the following sections.

3.1.1 ITN distribution

In the year 4 work plan, the project planned to distribute LLINs/LLIHNs to maintain optimal coverage among both local residents and MMPs in malaria endemic areas (1 ITN/1.8 resident and 1 ITN/1 migrant). CAP-Malaria supported topping up based on findings from routine monitoring, and the replacement of LLINs/LLIHNs over three years old in the lending scheme, The project also distributed some nets as part of

other project activities such as Day-3+ surveillance response, malaria week, and the malaria outbreak response.

CAP-Malaria's targeted distribution was necessary justifiable for the following reasons: a) many nets were originally distributed in 2012 and normal wear, tear and loss have occurred. b) CNM's topping up system was inadequate or unavailable in some areas during the reporting period.

In the last quarter of this period, the national ITN distribution campaign started in all ODs, including those ODs under CAP-Malaria. However, LLINs/LLIHNs procured by UNOPS were insufficient in number due to the underestimation of needs in some ODs. Consequently, CAP-Malaria was asked by some ODs to fill the gap. CAP-Malaria did so after consultation with CNM and UNOPs, both of whom did not object. In some cases (see details below) CAP-Malaria provided both nets and support for logistics costs, while in other cases only logistical costs were provided to distribute nets procured by others (GF). During project year 4, 95,215 LLINs (USG=94,584, GF=631) and 28,246 LLIHNs (USG= 28,227, GF=19) were distributed using CAP-Malaria funding. As detailed in table 3, 38,139 LLINs, and 22,916 LLIHNs were distributed as a top-up measure following net monitoring activities; 41,772 LLINs, and 1,261 LLIHNs were replaced through the ongoing lending scheme; and 15,304 LLINs and 4,069 LLIHNs were distributed as part of CNMs campaign in June 2015.

Table 3: LLIN/LLIHN distributed in CAP-M target from October 1, 2014 –September 30, 2015

OD	Top-up		Replacement		Fill-gap (campaign)				Total	
	USG LLINs	USG LLIHNs	USG LLINs	USG LLIHNs	USG LLINs	USG LLIHNs	GF LLINs	GF LLIHNs	LLINs	LLIHNs
BTB	8,366	4,637	12,304	248	600	300	0	0	21,270	5,185
SPL	10,645	4,200	8,950	100	0	0	0	0	19,595	4,300
SPM*	3,630	2,600	755	250	3,805	1,350	231	19	8,421	4,219
MRS	0	0	0	0	0	0	0	0	0	0
SNK	50	50	0	0	6,150	2,100	0	0	6,200	2,150
PLN	0	0	0	0	2,418	0	0	0	2,418	0
PPT	4,600	1,200	17,900	0	0	0	0	0	22,500	1,200
SRG	8,400	8,600	1,485	250	1,700	300	0	0	11,585	9,150
SMR*	1,173	836	378	171	0	0	0	0	1,551	1,007
STT	565	354	0	0	0	0	400	0	965	354
BLN	710	439	0	242	0	0	0	0	710	681
TOTAL	**38,139**	**22,916**	**41,772**	**1,261**	**14,673**	**4,050**	**631**	**19**	**95,215**	**28,246**

* Among the top-up, 3,862 ITNs were distributed through malaria outbreak response.

In the reporting period, the project was able to reach 86% of its year 4 target. The reason for this is that CAP-Malaria chose to coordinate its timing closely with CNM to prevent a recurrence of the experience of net distribution of 2012. That year, the project learned that any distribution occurring before the main campaign resulted in unnecessary net demands (moral hazard). To avoid this, although the project was forced to delay its activities until June 2015 (when the CNM campaign was implemented), we were able to more confidently ensure that net distribution was optimized to better reached the most in-need.

3.1.2 ITN monitoring

Continuing from year 3, this activity is still being implemented by VMWs/MMWs in BTB, SPL, PPT, and SRG ODs. As mentioned above, VMWs/MMWs provide top-up LLINs/LLIHNs to any households or farms that do not have enough nets, based on data collection using a monitoring checklist during each visit.

In this reporting period, the monitoring system underwent some changes based on the strategic information generated during the process. In the past, VMWs were expected to monitor the net situation among 20 households and 15 farms per quarter. However, experience suggests that VMWs/MMWs are not able to complete all HH within on a quarterly basis due to their personal commitments (planting, harvesting, etc.) Thus, the project management decided to extend its full cycle to six months (a semester) with a requirement to visit 15 HHs, and 10 farms in each of BTB, PPT, and SRG ODs. The only exception to this change is SPL OD, where the quarterly visits system will remain unchanged due to the special circumstances present in Cambodia's only pre-elimination area. Should experience during the pre-elimination activities show that

changes are required, recommended changes will be documented in the project final report. Key project achievements in year 5 include:

- 73,841 and 70,076 households were visited by VMWs in the first and second semesters, respectively. Most households were visited more than once. Compared to the first semester, households visited in the second semester decreases by 19%, 3%, and 29% respectively in BTB OD, PPT OD, and SRG OD. In the pre-elimination OD, visits increased by 36%. The reason of increasing proportion in SPL OD is due to continuous strengthening of monitoring among VMWs while the decreasing in the rest is owning to the change of visiting cycle.
- 11,562, and 10,976 farms were visited in the first and second semesters, respectively, and like with HHs, each farm was visited more than once. Similarly, the visits generally decreased in 2nd semester, except in SPL OD. Note that in SRG OD, there are only a few farms, and no regular monitoring is made by VMWs.

Table 4: Number of household visited by VMWs

OD	Oct14-Mar15	Apr15-Sep15	Difference
BTB	17,069	13,794	-19%
PPT	18,892	18,296	-3%
SPL	17,022	23,210	36%
SRG	20,858	14,776	-29%
Total	73,841	70,076	-5%

Table 5: Number of farms visited by VMWs

OD	Oct14-Mar15	Apr15-Sep15	Difference
BTB	7,092	6,354	-10%
PPT	2,809	2,153	-23%
SPL	1,661	2,469	49%
Total	11,562	10,976	-5%

As shown in table 6, between April and June 2015 (before the main distribution campaign), the proportion of usable LLINs were under 90% in all ODs. However, the situation improved between July and September following the national CNM campaign (which received support from CAP-Malaria as described earlier in section 3.1.1). As a result of the joint efforts, the proportion of usable LLINs is 99% in BTB OD, 98% in PPT OD, 99% in SPL ODs and 91% in SRG OD. The improvements are particularly significant in SPL, PPT, and SRG.

Table 6: Usable ITN through monitoring in second half of project year 4

OD	**Apr15-Jun15**			**Jul15-Sep15**		
	# LLINs	**# Usable**	**%**	**# LLINs**	**# Usable**	**%**
BTB	19,075	16,974	89%	16,872	16,723	99%
PPT	22,079	1,6780	76%	24,633	24,212	98%
SPL	29,834	23,095	77%	32,732	32,348	99%
SRG	20,273	13,518	67%	20,674	18,901	91%

Since the last semi-annual report, CAP-Malaria simplified the monitoring data collection form to better capture key information in a more user-friendly way. The revised form now provides the project with a way to directly monitor the proportion of households with 100% coverage (based on the national target ratio of 1:1.8 for residents, and 1:1 for workers). Additional LLINs provided as part of the topping up process are recorded on the form for HHs or farms without full coverage.

During the last quarter of year 4 (July 2015-September 2015), 92%, 88% 91%, and 81% of HHs in BTB, PPT, SPL and SRG were found to have full coverage. The remainder required immediate topping up.

Table 7: LLIN Coverage in households in BTB, PPT, SPL, and SRG

OD	Total HH	HHs with 100%	%
BTB	4,766	4,374	92%
PPT	10,999	9,665	88%
SPL	9,591	8,741	91%
SRG	2,262	1,832	81%

In the same period (July 2015-September 2015), the coverage in the farms is fairly high when comparing the numbers of workers versus the numbers of LLINs available at each farm. In SPL OD, the coverage is a bit lower than in BTB because about half of lending scheme villages in BTB received replacement nets in 2014.

Table 8: LLIN Coverage in farms in BTB and SPL

OD	# farms	# workers being hired	# usable LLINs	# top-up	# farms with 100% coverage	%
BTB	1,482	8,167	11,257	674	1,472	99%
SPL	1,177	13,239	8,414	1,874	985	84%
Total	2,659	21,406	19,671	2,548	2,457	92%

As VMW/MMW visits to farms are continuing, it is expected that full coverage will be achieved shortly. The year 5 work plan includes continued monitoring, with particularly intensive visits planned in SPL (the pre-elimination OD). As usual, LLINs/LLIHNs will be made available at the VMW/MMW level when gaps are identified.

3.1.3 BCC Interventions/Services

During project year 4, main BCC activities included 1) interpersonal communication (IPC) through outreach health education provided by VMWs, 2) school health education in 2 ODs, 3) IPC through taxi drivers, 4) community mobilization (malaria week, World Malaria Day, and community theater, and 5) development and distribution of billboards and BCC materials.

3.1.3.1 Interpersonal Communication (IPC)

a. Outreach Health Education by VMWs

Promoting malaria awareness and motivating target groups, particularly mobile/migrant populations (MMPs) to adapt behavior change through IPC is now the main communication mode of the CAP-Malaria project. At the community level, VMWs/MMWs use their IPC skills to gather both male and female MMPs to conducting small group education at farms or elsewhere within their catchment areas. By using IPC skills, VMWs/MMWs have been able to create a friendly environment which enables the workers to better understand key malaria messages during the HE process.

During project year 4, outreach HE activities were implemented in 5 ODs (Poipet, Samrong, Sampov Meas, Battambang and Sampov Loun) out of 11 ODs where CAP-Malaria supports VMWs/MMWs. As described in table 9 below 48,629 male 51,394 female MMPs in 5 ODs were reached this project year through VMW/MMW-provided IPC. Of the females, 1,037 (2% were pregnant).

Table 9: MMPs received malaria messages through outreach HE activity

OD	**1st semester (Oct 14-Mar 15)**			**2nd semester (Apr 15-Sep 15)**		
	Male	Female	Pregnancy	Male	Female	Pregnancy
Poipet	5,752	5,384	194	4,566	4,724	64
Samrong	584	548	9	290	385	7
Sampov Meas	836	699	20	1,617	1,651	21
Battambang	5,323	5,726	96	2,374	2,101	106
Sampov Loun	11,008	11,912	158	13,397	14,399	383
Total	**23,503**	**24,269**	**477**	**22,244**	**23,260**	**581**

b. School Health Education (SHE)

Project year 4 saw the phase-out of the school health education (SHE) activity in Pailin as CAP-Malaria began it's exit process. SHE was briefly introduced in Ratanakiri for during the first six months of the project year, after which the activity was handed over to the government education office. SHE activities in SPL, Battambang Province, were continued in year 4.

SHE has become a key part of multi-sectoral collaboration that is a key element of pre-elimination in SPL. In other words, as SPL moves toward elimination, SHE will remain part of the multi-pronged communication approach to help identify, test suspected, and treat malaria cases OD-wide.

ToT training conducted in Battambang in 2014.

During this reporting period, CAP-Malaria organized a 2-day training of trainers (ToT) session for staff of the Provincial and District Education Offices (PoE and DoE) in SPL OD and Ratanakiri Province. The project also organized training and refresher training for 311 (115 female) teachers in SLP and 74 (12 female) teachers in Ratanakiri. The trained teachers are the resource for educating students using the national curriculum. Between November 2014 and July 2015, 10,813 student (5,375 female) received malaria messages via the trained teachers (August and September 2015 were school holidays). An end line assessment will be planned in project year 5 to assess message recall, message sharing, and other process indicators.

Table 10: Number of students receiving malaria messages from the trained teachers

Province	District	Total # of targeted schools	# of schools integrating malaria HE	# of classes (grade 4,5 &6)	# of teacher	# of students (non-cumulative)	
						Total	Female
Battambang	Sampov Loun	19	19	81	81	2,656	1,238
	Phnom Prek	26	26	100	100	2,877	1,442
	Kamrieng	40	40	136	134	3,517	1,885
Ratanakiri	AndongMeas	12	12	20	15	474	205
	Taveng	5	5	10	9	269	128
	Veunsay	24	19	44	34	1,020	477
Total		**85**	**85**	**391**	**373**	**10,813**	**5,375**

c. Taxi Drivers

In the first 5 months of Y4, 72,930 travelers (25,637 MMPs) were provided with malaria messages by the trained taxi drivers in Battambang Province, were exposed to malaria TV/audio spots played in the taxis. BCC materials, including stickers, sun shades, and leaflets were also distributed. Since April 2015, taxi driver activity had been recommended to discontinue.

3.1.3.2 Community mobilization

a. Malaria Week

As in previous years, CAP-Malaria carried out malaria week activities, since it has been a key community-based activity promoting early diagnosis and treatment to reduce transmission reservoirs, increase availability of preventive tools and raise awareness using a participatory approach for high risk populations (MMPs, residents and ethnic minorities) residing in remote-endemic villages.

During year 4, malaria week was implemented in 9 of 11 CAP-Malaria ODs. The implementing ODs were selected based on demographic factors and malaria incidence and the intensity of the activities varied by OD

based on each one's malaria burden. Because the number of confirmed cases in in Stung Treng increased from 3,662 in July and August 2013 to 6,454 during the same period in 2014, more resources were allocated to this province for malaria week. The hardest hit villages, particularly those around Siem Pang HC received particular attention

With the active involvement of key actors including local authorities, village malaria workers, health center and CAP-Malaria staff, malaria week was successfully conducted in 125/126 (99%) of targeted villages. Through efforts of local authorities and VMWs, both male and female target populations were encouraged to participate in the events. As result, an estimated 24,524 (1,597 mobile/migrant) persons attended. As shown in table 11 below, a total of 4,380 persons were screened, of which 140 tested positive and were subsequently treated.

Table 11: Summary of malaria week activity implemented in 9 ODs in 2015

OD/Province	Planned villages	Implemented villages	Participants				BCC material Distributed		# of ITN distribution	Malaria screening and treatment					
			Resident		Migrant										
			Male	Female	Male	Female	T-shirt	Poster		# of screened	Total positive	# *Pf*	# *Pv*	# *Mix*	Total Treated
SNK	10	10	620	1230	95	24	24	155	0	117	15	12	2	1	15
STT	30	30	3618	4062	120	72	0	1,993	0	251	39	10	17	12	39
PST	4	4	591	465	89	39	0	320	0	671	24	17	6	1	24
RTK	20	20	1527	3053	77	37	0	1,420	0	2435	30	11	10	9	30
BTB	7	6	198	336	37	19	0	70	0	0	0	0	0	0	0
MRS	10	10	810	345	19	6	0	880	0	228	8	0	6	2	8
SRG	15	15	365	580	30	32	0	610	0	64	13	10	3	0	13
SPL	10	10	250	389	181	179	0	327	145	29	2	1	1	0	2
MDK	20	20	2804	1684	366	175	0	995	165	585	9	0	7	2	9
Total	**126**	**125**	**10,783**	**12,144**	**1014**	**583**	**24**	**6,770**	**310**	**4,380**	**140**	**61**	**52**	**27**	**140**

b. Community Theater Performance (CTP)

Based on last year experience, CAP-Malaria again worked with *Phare Ponleu Selpak* (PPS), a local theater and circus NGO, to implement 8 sessions of Community Theater in Stung Treng and Ratanakiri due to the high numbers of confirmed malaria cases reported there in 2014. In addition, four sessions were conducted in SPL OD to reinforce the pre-elimination activities there. Although malaria cases in SPL have been lower than elsewhere (thus it was chosen as a pre-elimination model area), CTP was conducted there because (1) it is a pre-elimination area, (2) many of SPL's residents move to work in malaria endemic areas in other provinces where they risk infection by malaria and can

Theater performance and acrobat circus show conducted in Ratanakiri, 2015. Photo: Sam Sokharun

return home with parasites, and (3) the movement of migrant workers in SPL is significant. The activity was thus intended to reach MMPs with malaria messages before they leave SPL for other places.

Using a combination of circus acts (acrobatics) and public announcements via mobile loudspeakers, the performers attracted an audience, making special efforts to inform and attract at-risk populations, particularly male forest workers to get involved and come see the show. As result of these approaches, approximately 8,676 (1,646 MMPs) audiences participated.

Table 12: Summary of CTP activity results

Province	Name of village	Participants attended				Poster distributed	ITN distributed	Malaria screening and treatment					
		Local resident		MMP				# of screened	Total positive	# *PF*	# *PV*	# *Mix*	# treated
		M	F	M	F								
Battambang	Bannlem	200 (Thai)	300 (Thai)	279	334	0	0	0	0	0	0	0	0
	Bour	164	183	86	118	32	25	0	0	0	0	0	0
	Samaki	215	308	104	128	205	10	0	0	0	0	0	0
	Kam Prong	324	215	221	90	200	10	0	0	0	0	0	0
Stung Treng	Chrob	40	530	30	0	0	0	17	1	1	0	0	1
	Kanhchanhkok	310	570	0	0	0	0	12	0	0	0	0	0
	Siem Pang	399	385	43	0	0	0	18	3	2	1	0	3
	Chhvang	499	488	15	3	0	0	34	2	0	2	0	2
Ratanakiri	Plor	320	380	26	24	0	0	246	0	0	0	0	0
	Andong Meas	250	250	23	22	0	0	5	1	0	1	0	1
	Veunsay	220	380	32	28	0	0	18	0	0	0	0	0
	Taveng	280	320	28	12	0	0	60	0	0	0	0	0
Total		**3,021**	**4,009**	**887**	**759**	**437**	**45**	**410**	**7**	**3**	**4**	**0**	**7**

At the end of each show, CAP-Malaria in collaboration with PHD, OD and HC staff conducted a rapid assessment. PHD/OD/HC staff were trained how to select and interview respondents by using assessment tool developed by CAP-Malaria. Thirty-three respondents were interviewed, and the findings are summarized below:

- 70% of respondents had a grade 7 education or 71% said the reason for participating in the activity was to get malaria knowledge
- 39% heard about the event from the mobile loudspeakers, 33% from VMWs, and 17% from neighbors
- 56% said the new message they learned from the show was “sleeping under ITN prevents malaria”, 21% learned about “early diagnosis and treatment by VMW” and 13% learned new information about “not buying anti-malaria drugs by yourself to avoid counterfeit drugs”.
- 100% said that passing malaria messages through CTP is useful.
- 87% said receiving malaria message through CTP is a way from what they exposed before.
- 100% committed to apply what they learnt from CTP.
- 91% said they will go to VMWs/HCs if they suspect malaria.
- 78% understand the advantages of taking anti-malarial drugs as prescribed
- 44 % said using counterfeit malaria drug can’t cure malaria; 36% said it causes death and 18% said it wastes time and money.

c. World Malaria Day 2015 (WMD 2015)

World Malaria Day (WMD) 2015 in Cambodia was organized on 22nd April. CAP-Malaria together with CNM and local health authorities organized activities in 9 target provinces to increase malaria awareness of at-risk populations including MMPs living in malaria endemic areas, and to engage community participation.

The Minister of health visited CAP-Malaria BCC material's booth during national World Malaria Day conducted in Preah Vihear, 2015. Photo: Sam Sinat

To support the events, a variety of BCC materials were printed and distributed. These included long sleeve shirts, banners and other materials that promoted 4 main themes such as (1) consistently sleeping under an LLIN contributes to malaria elimination, (2) having a blood test and getting malaria treatment on time eliminates malaria, (3) taking malaria dugs as prescribed by health staff eliminates malaria, and (4) we can eliminate malaria.

This year, CNM chose Kulen High School in Preah Vihear Province as the location to organize a national WMD event presided over by the Minister of Health. CAP-Malaria was invited by CNM to participate and to provide materials and a BCC material booth.

During the event, the Minister visited CAP-Malaria booth and showed much interest in CAP-Malaria activities and products, and spent time with our staff during which he complimented CAP-Malaria on the produced BCC materials, saying they were not only creative but useful to various target groups. The Minister then turned to someone wearing a CAP-Malaria shirt and told them – "You're wearing a very meaningful and quality shirt".

In SPL, CAP-Malaria supported Battambang PHD to organize a joint event between Battambang PHD and SPL OD, with cross-border colleagues from Chanthaburi PHO, Pong Nam Ron and Soi Dao VBDU, Sakeo PHO and Klonghat VBDU, Thailand. During the event, the delegates and participants from both countries actively participated in the event. In addition, BCC materials included bilingual ones that were distributed to at-risk populations such as residents, internal and cross-border migrants.

3.1.3.3 Billboard

To support malaria pre-elimination activity in SPL, 8 billboards promoting message "We eliminate malaria" were printed and installed. At the same time, the project keeps maintaining the existing billboards in other target provinces. During this reporting period, 3 billboard's screens were printed to fix the damaged billboard in Oddar Meanchey, Battambang and Siem Reap provinces.

3.1.3.4 BCC materials

To support project interventions, various BCC materials were developed, printed and distributed during this period. Table 13 provides a full list of materials printed and distributed in project year 4. Some highlights are:

- Provision of technical and financial support to design, print and distribute updated **National Treatment Guideline** 2014 (NTG) in both Khmer and English versions for CNM/PHD/OD/HFs.
- Designed and disseminated 3 issues of project newsletter which highlighted key project accomplishment and successes.
- Produced and mounted signboards in SPL to alert communities malaria hot spots (Local transmission).
- Developed, printed and distributed in high-risk areas, a poster to publicizing hotline phone numbers to be used should anyone have questions about malaria.
- Other materials were printed and distributed such as VMW's bags, posters, flipcharts, booklets, etc.

Table13: BCC materials printed and distributed in Y4

Nº	Name	Balance in Oct 2014	Total in 2015		
			Printed	Distributed	Balance
1	VMW Bag	33	380	363	50
2	Bag for cross border meeting	21	0	5	16
3	Taxi cap	321	0	38	283
4	Sunscreen for car and taxi windows	263	0	100	163
5	Clock	156	80	176	60
6	Flipchart	1,368	0	735	633
7	Pregnant woman poster	909	2,000	2,909	0
8	EDAT Poster	1,000	5,000	3,367	2,633
9	LLIN usage	0	2,500	0	2,500
10	LLIN use at home and forest	477	5,000	2817	2,660
11	LLIN Use save money	600	5,000	2,916	2,684
12	Taxi sticker	403	0	183	220
13	Taxi uniform	9	0	9	0
14	Media one t-shirt (pink color)	122	0	122	0
15	WMD T-shirt	11	0	11	0
16	WMD Long Sleeve Shirt 2015 Khmer	0	1,000	1,000	0
17	WMD Long Sleeve Shirt 2015 Thai	0	750	750	0
18	WMD Banner 2015	0	175	175	0
19	SHE curriculum Book (A4)	94	400	411	83
20	Migrant leaflet	20,000	20,000	23,400	16,600
21	VMW uniform at check point	0	100	100	0
22	Bilingual Poster EDAT	0	500	500	0
23	Bilingual Poster malaria symptom	0	500	500	0
24	Bilingual Poster Spraying on the wall	0	500	500	0
25	Bilingual Poster ITN impregnated	0	500	500	0
26	Bilingual Poster ITN sleep under net	0	500	500	0
27	Billboard 3.5m x 5m	0	4	4	0
28	Billboard 1.5m x 2.5m	0	4	4	0
29	Screen billboard	0	3	3	0
30	Project planner 2015	0	400	400	0
31	Parasol for border check point	0	13	13	0
32	Hotline Poster	0	3,000	2,934	66
33	Malaria signboard for hotspot	0	60	43	17
34	Malaria NTG 2014 Khmer version	0	1,000	760	240
35	Malaria NTG 2014 English version	0	400	59	341

Among the key BCC activities planned for the final project year are:

- Finalizing BCC materials for pre-elimination in SPL;
- Integrating gender in IPC for HF staff and VMWs/MMWs;
- Continuing BCC implementation and undertaking assessments of key activities.

3.2 Malaria diagnosis and treatment

In year 4, CAP-Malaria supported 522 VMWs in 260 villages and 66 MMWs (total 588) and worked with 196 HFs in 11 target ODs. The project also provided support to 150 VMWs in villages under GF support to expand their activities from routine passive services to treatment follow-up, surveillance and response. CAP-Malaria supported strengthening the quality of malaria diagnosis and treatment in compliance with standard operational procedures (SOPs) and the National Treatment Guidelines (NTGs).

At the community level and in the private sector, RDTs are used for malaria diagnosis and first line treatment with ACT for uncomplicated malaria. For severe and complicated malaria cases, the NTGs recommend referral of such cases to public HFs. Specifically in Zone 1, private providers are not allowed to treat malaria patients but only to consult, educate, test, and refer while for Zone 2 and 3, private providers may treat uncomplicated malaria but must refer the severe, complicated malaria cases, including pregnant women and children under five years old to public facilities.

At public HFs, malaria diagnosis has been encouraged using microscopy as the gold standard, while RDTs are reserved only for facilities without a microscope and lab technician. Quality Assurance (QA) standards and processes of malaria microscopy were developed and followed up in 89 HFs, applying microscopy QA SOPs that were developed with support from CAP-Malaria and input from central and field staff of the national malaria program.

3.2.1 Training on RDT Use and Basic Microscopy

CAP-Malaria and its counterparts continue to build capacity on malaria diagnosis and case management of HF staff and VMWs/MMWs. The staff and volunteers are trained in the use of RDTs. CAP-Malaria trained 189 HF staff and 750 VMWs/MMWs in RDT use and 49 HF staff were trained on basic microscopy in this reporting period. Performance assessment of HF staff and VMWs/MMWs on diagnosis is conducted through technical supervision and on-the-job training is provided accordingly for those who still poorly perform test.

Usually, the training curriculum on RDT is combined with training on malaria case mangement during the same session (See table 14). Moreover, CAP-Malaria provides VMWs with training on microscopic slide preparation (smear making) as an integral part of intensified *Pf* case management.

3.2.2 Training on Malaria Case Management

CAP-Malaria and CNM built capacity on malaria case management among HF staff and VMWs/MMWs as well as of private providers. Based on an assessment and consultative meetings between CAP-Malaria and counterparts, the trainees were identified and training included in the 2014 AOP of each OD receiving CAP-Malaria support. CAP-Malaria also trained community VMWs and HF staff for Day-3(+) *Pf* malaria surveillance and intensified malaria case management.

During this reporting period, 750 VMWs and 189 HF staff were trained on case management as per Table 15 below.

Table 14: VMW/MMW and HF staff trained on malaria case management & RDT use (Oct 2014- Sep15)

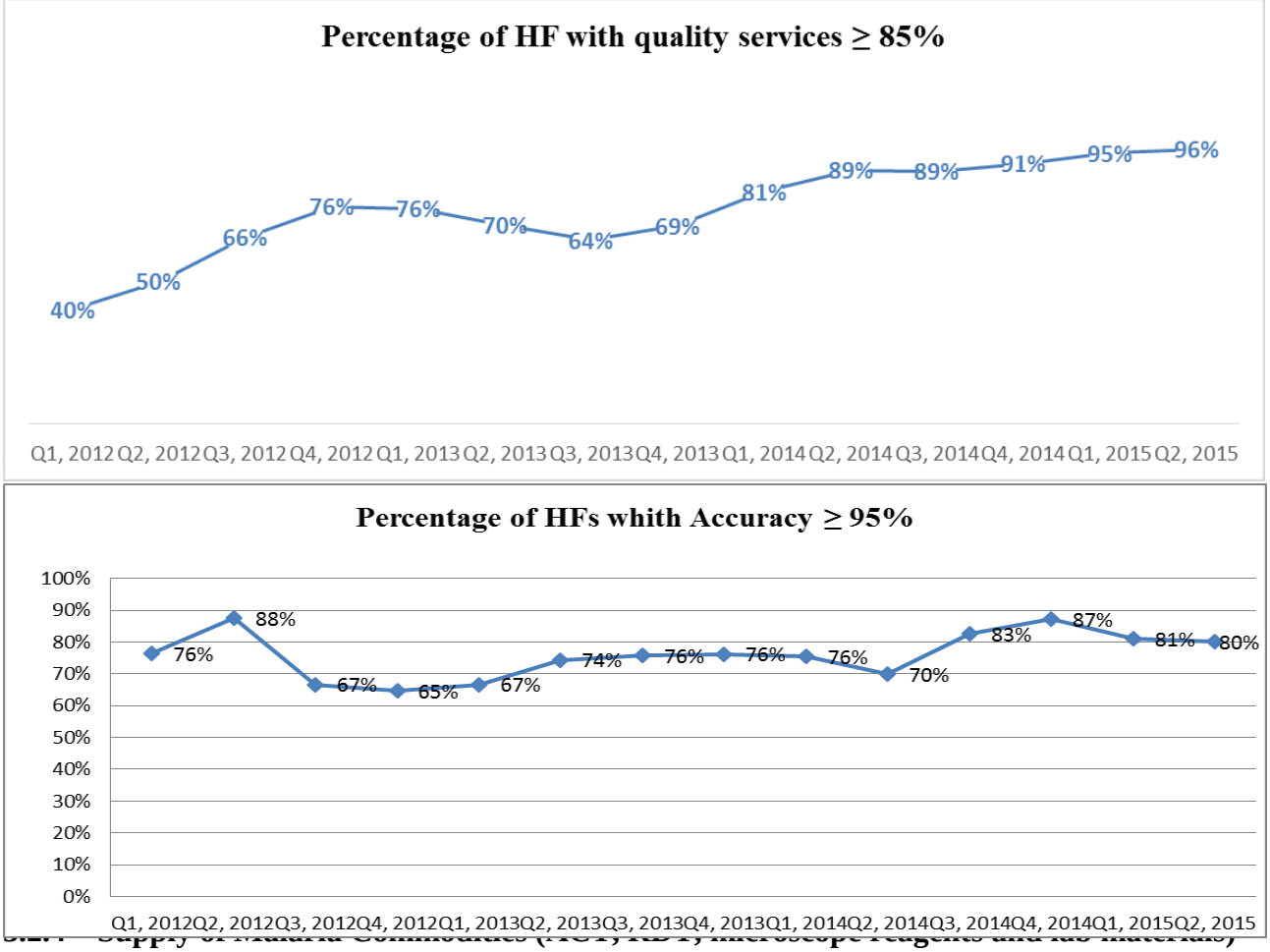
Trainee	Actual result by OD												
	Target	Actual	PPT	MRS	SPL	BTB	SMR	SPM	SNK	SRG	PLN	BNL	STT
Total	824	939	49	16	204	132	109	70	12	176	22	35	114
Male	N/A	462	29	11	87	50	57	53	6	67	15	29	58
Female	N/A	477	20	5	117	82	52	17	6	109	7	6	56
HF staff	180	189	13	1	32	24	0	35	12	15	22	35	0
VMW	644	750	36	15	172	108	109	35	0	161	0	0	114

109 VMWs in SMR OD were trained on simple malaria case management before the project exit in Year 5, they are CNM VMW that CAP-Malaria supported in 3 *Pf* Day-3 surveillance sites.

3.2.3 Quality of Malaria Diagnosis and QA System

CAP-Malaria strengthens the capacity of lab staff at HFs and sets up quality assurance systems (QA) to ensure quality of malaria diagnosis, starting from slide preparation to slide reading, recording, and maintaining samples. A lab QA system was set up in 13 new HFs in this reporting period bringing the total number of HFs with such systems to 89 by September 2015. As part of the supervision process, slides were randomly selected from HFs on a quarterly basis. The collected slides were read and crosschecked by the provincial lab supervisor (blind checking). Feedback on the quality of slides and accuracy of results was provided to the HFs with recommendations for improvement.[2] On-the-job training is provided at the source, mainly during supervision. Supply of lab materials and reagent is followed up for quality of microscopy diagnosis. Some HFs didn't have slides readings due to a low number of suspected malaria cases among those using services in those health facilities.

Figure 15: Percent of HFs with quality services ≥85% in 11 ODs: Q1 2012-Q2 2015



CAP-Malaria field staff based in each target ODs work closely with OD supervisors and HF staff to monitor the stock situation of malaria testing tools and anti-malaria drugs available at OD and HFs as well as at community level with VMWs/MMWs. CAP-Malaria coordinated transfer of excess RDTs and ACTs from overstocked ODs to ODs experiencing stock-outs. A number of lab reagent supplies were locally procured by CAP-Malaria to support HFs experiencing stock outages. During this reporting period, CAP-Malaria provided 9 new microscopes to HFs and 16,025 RDT tests to HFs and VMWs/MMWs in its target areas and supplied reagents and lab materials such as ziemsa, methanol, slides, slide boxes and a number of registration books. Regarding ACT supply:

[2] Based on Lab QA SOP the acceptable level of slide reading accuracy is 95% and minimum overall service quality is 85%.

- In the first semester of year 4, only 3 out of 31 health facilities visited in 2 ODs experienced ACT stock-outs. CAP-M responded by redistributing ACTs from HFs with excess supplies.
- In the last quarter of year 4, CAP-Malaria supported the transportation of ACT from Phnom Penh to the field, once to SPM, and once to SMR.

3.2.5 Malaria Cases Treated by HFs and VMWs/MMWs

During this reporting period, VMWs/MMWs and HFs conducted 95,880 malaria tests of suspected cases and treated 25,974 confirmed cases. Of these, CAP-Malaria-supported VMW/MMWS treated 5,041 (19.4%) of total treated cases. More malaria cases were captured by VMW/MMWs (54.4% or 14,149/25,974 cases) than by HFs which identified 45.6% (11,825/25,974 cases). This shows the importance of VMW/MMWs in the EDAT of malaria in Cambodia.

***Table 15: Number of confirmed* malaria cases in CAP-Malaria target ODs from Oct 2014-Sep 2015**

OD	Total cases (HF+VMW)	Cases detected by HF	Case detected by VMWs/MMWs		
			ALL	GF	CAP-M
Battambang	1,119	297	822	106	716
Maung Russey	488	328	160	160	0
Sampov Loun	571	369	202	0	202
Sampov Meas	6,901	2,672	4,229	3,209	1,020
Poipet	186	150	36	11	25
Samrong	4,826	1,530	3,296	581	2,715
Pailin	387	316	71	71	0
Sotnikum	975	247	328	308	20
Senmonorum	1,671	897	774	774	0
Banlung	3,589	2,778	811	811	0
Stung Treng	5,164	1,672	3,492	3,295	197
11 ODs	**25,877**	**11,656**	**14,221**	**9,326**	**4,895**

3.2.6 Public Private Mix (PPM)

Qualified private providers (PPs) registered with OD/PHD were invited to join the malaria PPM activities. These PPs engage in malaria education, diagnosis and treatment as well as make referrals of malaria cases to public HFs. During this reporting period, CAP-Malaria continued working with 167 registered PPs in the selected areas as shown in Table 17 below.

Table 16: Number of private providers in PPM by site/OD in 2015

No	Site/OD	Clinic/Cabinet	Drug shops	Total
1	Pailin (Zone 1)	31	17	48
2	Sampov Meas (Zone 1+2)	62	18	80
3	Maung Russey (Zone 2)	31	8	39
Total		**124**	**43**	**167**

CAP-Malaria and OD staff conducted monthly monitoring and supervision of PPs for information sharing, provided on-the-job training and monitored PPs activities including data collection on malaria cases tested, treated and referred.

In 2015, CNM revised its PPM strategy and SOP. This revision will result in CNM taking full responsibility for PPM implementation in all ODs in Zone/Tier 1, except SPL OD where pre-elimination is currently being implemented by CAP-Malaria; the rest of ODs in Tier 2 will be taken over by PSK. This change will be effective from September 2015 onwards.

During the reporting period, the project achieved the following results:

PPs in PLN OD (zone 1/tier 1):

- 83 cases were referred to HFs; 84% (70/83) presented at the referral destinations.
- 63 cases were confirmed and treated (*Pf*=26, *Pv*=33, *Pmix*=4) at HFs.
- All of them were adults with 78% being male.

PPs in SPM OD (zone 1, Veal Veng district):

- 381 cases were tested by PPs and referred to HFs.
- 176 (*Pf*=108, *Pv*=38, *Pmix*=30) were confirmed and treated by HFs.

PPs in In SPM OD (zone 2 apart from Veal Veng district):

- 3,471 cases were tested out of 3,475 suspected cases.
- 1,910 cases (*Pf*=1,207, *Pv*=407, *Pmix*=296) were confirmed and treated.
- The cases are predominantly among adult males (94%).

PPs in MRS OD (zone 2):

- The cases were, as elsewhere, predominantly among adult males (91%).
- 213 cases were tested out of 263 suspected cases.
- 126 cases (*Pf*=57, *Pv*=42, *Pmix*=27) were confirmed and treated.

3.2.7 Intensified Malaria *Pf* Case Management (Community *Pf* Day-3 Surveillance)

The objective of the intensified case management of *Pf* malaria at community-health facility level is to strengthen case surveillance and to contribute to mitigating, containing the potential spread of, and eventually eliminating falciparum parasites resistance to Artemisinin derivatives from the emerging area to other areas.

There were 13 sites under *Pf* malaria surveillance in year 4. One site in Kvav HC in SNK OD was stopped due to CNM taking over the site while conducting a drug therapeutic efficacy study (TES).

During this reporting period there were 2,490 Day-0 Pf/Mix cases enrolled in 13 surveillance sites, of which only 13 cases remained positive on Day-3 (see table 18).

Table 17: Cases followed up by malaria zone from October, 2014-September, 2015.

No.	OD's Name	HF's Name	Starting (MMM-YY)	% of enrolled Pf/Mix cases	VMW+HF Pf/Mix cases (MIS+HIS)	Enrolled Pf/Mix cases	Microscope Day-0			Microscope Day-3			Microscope Day-7			Microscope Day-28		
							PF	Mix	Neg	Lost FU	PF	Neg	Lost FU	PF	Neg	Lost FU	PF	Neg
1	BTB	Tasanh	Sep-10	37%	114	42	34	7	1	0	7	35	1	0	6	1	1	1
2	BTB	Kampong Lpov	Jun-11	59%	37	22	20	2	0	0	2	20	1	0	1	1	0	1
3	SPL	Trang	Oct-10	49%	49	24	16	5	3	2	0	22	0	0	0	0	0	0
4	SRG	Anlong Veng	Jun-11	51%	255	131	130	1	0	0	1	130	0	0	1	1	0	0
5	SPM	Pramaoy	Aug-12	63%	1726	1083	1083	0	0	5	2	1076	0	0	2	1	0	1
6	SPM	Thmar Da	Aug-12	95%	86	82	78	4	0	0	1	81	0	0	1	1	0	0
7	MRS	Prey Tralach	Aug-12	80%	207	166	163	3	0	0	0	166	0	0	0	0	0	0
8	SMR	Ou Raing	Dec-12	40%	68	27	27	0	0	4	0	23	0	0	0	0	0	0
9	SMR	Keo Seima	Dec-12	40%	177	70	44	26	0	9	0	61	0	0	0	0	0	0
10	SMR	Koh Nheg	Sep-14	34%	233	80	75	5	0	3	0	77	0	0	0	0	0	0
11	STG	Siem Pang	Sep-14	38%	1308	495	214	280	1	16	0	479	0	0	0	0	0	0
12	STG	Thalaborivat	Oct-14	57%	402	231	52	179	0	12	0	219	0	0	0	0	0	0
13	STG	Preah Romkel	Oct-14	40%	93	37	6	31	0	3	0	34	0	0	0	0	0	0
Total				**52.4%**	**4755**	**2490**	**1942**	**543**	**5**	**54**	**13**	**2423**	**2**	**0**	**11**	**5**	**1**	**3**

One patient was found to be positive on Day-28 and was referred to a HF by a VMW and he received second line treatment with quinine and tetracycline for 7 days as per the NTGs and finally was cured.

Two of thirteen patients who remained positive on Day-3 were not found on Day-7 and 5 of the 13 patients were not found on Day-28 for follow up; apparently both of them moved to other places and were not traceable. VMWs met with 4 patients that had not moved on Day-28.

Screening surrounding detected Day-3(+)

Since early 2013, CAP-Malaria and its partners have provided comprehensive intervention packages including (1) active case detection by screening 10 households living around the index case, (2) treating

confirmed cases with ACT, (3) providing health education messages on prevention and treatment through IPC, (4) ensuring high net coverage and net treatment, and (5) providing indoor residual spray (IRS) in households surrounding the house of the index cases. During this reporting period (October 2014 to September 2015) 13 index cases were identified. 202 people surrounding 8 of the 13 index were screened and 3 *Pf* and 5 *Pv* malaria cases were detected (and subsequently treated).

3.2.8 Challenges and the way forward

Because of low and often declining numbers of cases, maintaining the skills of VMWs to take quality slides remains a concern and warrants ongoing monitoring. A second important challenge is to complete the 28-day follow-up of mobile patients who test positive for malaria. By the very nature of their lifestyle, they move around and are often hard to locate. New approaches will need to be tested to increase follow-up of such cases (perhaps by using small financial incentives). A third important challenge is to ensure quality microscopy at rural HFs to detect low parasitemia cases on Day-3. Intensified efforts will be developed- possibly including double reading- to address this challenge.

In Project Year 5, CAP-Malaria commits to:

- Strengthening 28 days follow-up for *Pf/Pmix* cases in all HFs of SPL OD as part of the pre-elimination package;
- Strengthening 7 days follow-up *Pf/Pmix* case in 5 HFs of BTB OD, 4 HFs of SRG OD and 2 HFs in SPM OD;
- Stop all *Pf* Day-3(+) surveillance, except in 2 HFs in STT OD (Tier 2);
- Continue supporting VMWs to conduct 3 days of DOT;
- Strengthening the referral system for treatment failure cases and supporting hospitalization for second line treatment and severe case management.

3.3 Health System Strengthening

3.3.1 Program Management and Monitoring and Evaluation Strengthened

CAP-Malaria works closely with CNM and line programs at provincial, district and community levels by encouraging and leveraging common resources including human resources, commodities, shared data/information, and shared funding. Ownership and involvement of government counterparts has been always promoted and strengthened even though the activities are directly implemented with technical and financial support from CAP-Malaria. For efficient implementation and strong monitoring of the malaria program, comprehensive annual operational plans (AOP) were developed by target ODs/PHDs in collaboration with CAP-Malaria and other local NGOs. Progress of AOP implementation is reviewed on at least a semester basis.

Joint supervision and monitoring of HFs and VMWs/MMWs is conducted to support their performance and, if needed, to provide additional or emergency responses to emerging situations. The capacity of malaria program managers and malaria staff is improved through various trainings, meetings and workshops. During this reporting period, several trainings, workshops, and meetings were organized by CAP-Malaria and CNM and ODs including training/meetings on malaria *Pf* surveillance, training on case management, PPM feedback, midwife training, AOP workshop/progress review, microscopy QA workshop, etc.

To improve logistics management at HFs, the project supported logistics training to drug keepers that reached 198 staff during this reporting period. Follow-up meeting on stock management have been incorporated in OD/HF monthly meetings.

CNM engagement in the projects: Engagement of CNM senior and key staff in the project supported activities has always been a priority to CAP-Malaria. CAP-Malaria aligns its project monitoring and evaluation (M&E) system with the national program (data collection, data tracking/auditing) and helps strengthen the existing database systems (MIS, HIS) to ensure sustainability.

3.3.2 Multi-sectorial collaboration and coordination promotion

CAP-Malaria has also reached out to various potential partners, such as the School Health Department from the Ministry of Education for integration of malaria into the school health program; United States

Pharmacopeia (USP) for drug quality, PSK for PPM, Malaria Consortium for M&E, WHO for technical assistance, UNOPS for Global Fund supported areas, FHI-360, HPA, etc.

The functioning of the Provincial Special Working Group for Malaria Elimination ensures participation and responsibility/accountability of all stakeholders at provincial and district levels with technical guidance and supply of program commodities as well as resource leverage through national program and partners' assistance. The meeting of this special working group is scheduled on a quarterly basis. The project supported 3 meetings in Pailin Province and 2 meetings in Battambang province and 1 meeting in Pursat Province during the reporting period. In SPL, the special working groups in each of the three administrative districts were established and bi-monthly meetings were routinely conducted.

Cross-border collaboration

During the reporting period, CAP-Malaria worked closely with local counterparts to accomplish variety of cross-border activities including:

- **Quarterly meeting:** a twin-cities meeting was organized in SPL OD on 17 December 2014 in order to achieve 3 main objectives: (1) to follow-up the previous meeting and Thai-Khmer patient card study tour on 8th August 2014 in Chanthaburi, (2) to gather local malaria stakeholders from both sides of the border to improve coordination and implementation of practical interventions planned and (3) to explore opportunities for cross-border expansion to include Sampov Loun and Sakaeo.

Cambodian and Thai participants discussed HF map during twin-cities meeting in SPL, 2014.

The meeting was led by the Battambang Provincial Health Department and SPL OD staff with financial and technical support from CAP-Malaria. In total, 53 Cambodian and Thai participants took part in the meeting. Cambodian representatives from CNM, PHD, OD and HCs from Pailin were invited, as well as local authorities such as the District Governor and immigration police from 3 border check-points, namely Daung/Banlem, O'romdourl/Subthri and Phnom Dey/Khao Din. Thai participants included representatives of the Bureau of Vector Borne Disease Chanthaburi PHO, District Health Office of Ponamron and Soi Dao and Vector Borne Disease Unit of Ponamron and Soi Dao Districts. For Sakeo province, representatives of Sakeo PHO, Vector Bone Disease Control of Wattananakorn and Sakeo Districts were invited to participate as well.

Based on interactive discussions during the meeting, we achieved the expected outputs of the meeting that included:

- Reviewing activities implemented and collecting/discussing feedback from stakeholders;
- Updating progress on monthly exchanges of malaria data and the malaria situation on both sides of the border;
- Reviewing the use of the bilingual patient card including discussion of challenges, compliance, and recommendations for improvement;
- Discussing plans for World Malaria Day (April 2015);
- Proposing and prioritizing activities and timeline for coordinated plan, naming of focal persons.

During the previous 6 months we reached consensus on cross-border expansion to include Sampov Loun (SPL) in Cambodia and Sa Kaeo (SK), Thailand, setting a foundation that will help with pre-elimination activities in the area.

- **Monthly data sharing** between Pailin and Chanthaburi is done regularly. Of note is that as a result of the cross-border initiative, CAP-Malaria has been facilitating the sharing of information on 15 infectious diseases. Before making this happen, the implementers required a letter of agreement (LoA) between partners on both sides of the border. The LoA was prepared in Thai and Khmer by CAP-Malaria, reviewed by the 2 parties and it was signed and is now being applied.

- We are now in the process of finalizing posters on the life course and possible side effects of Primaquine (PQ). These posters will be used in the project target provinces in Thailand, namely Chanthaburi and Sakeo. The purpose of the life course poster is to illustrate the instructions for migrant

patients who suspect they have malaria to understand the process of malaria treatment and follow-up while the PQ poster promotes a message to alert patients to visit health staff quickly if his/her urine changes color after taking PQ. Both posters will be finalized and printed in May 2015.

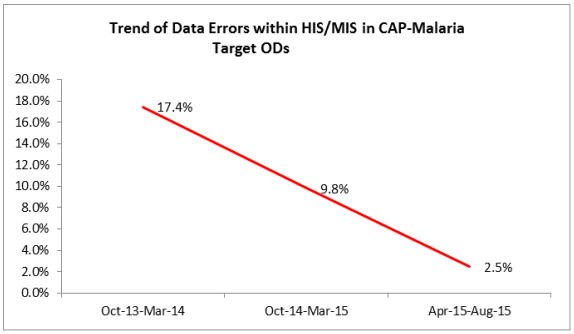
- As agreed in the meeting, the joint world malaria day ceremony was conducted at border of SPL with Chanthaburi and Sakeo. There was an exchange of delegates between both sides. CAP-Malaria supported bilingual printed malaria materials such as long sleeve shirts and other BCC materials.

3.4 Monitoring and Evaluation (M&E) and Strategic Information

Routine M&E data suggests that the CAP-Malaria Project has made significant progress towards the project goal of reducing the malaria morbidity and mortality rates and preventing the spread of artemisinin-drug resistance malaria in CAP-M target areas. The malaria morbidity rate per 1,000 populations has decreased from 21.42 to 16.6 and malaria mortality rate per 100,000 population dropped from 0.62 to 0.10 between October 2010 to September 2011 and October 2014 to September 2015 period.

The 2013 Cambodia malaria survey (CMS 2013) found that use of preventive interventions among population increased in CAP-Malaria target areas in Cambodia, however more work needs to be done to reach CNM targets and to avoid back-sliding. The survey found that the proportion of households owning at least one net has increased over the past decade, from 74.7% in 2010 to 89.5% in 2013. However, in 2013, only 62% of households had enough nets for all household members, limiting attainment of universal access. The percentage of households living in targeted, at-risk villages with at least one LLIN/LLIHN per 2 persons was 62.2% in 2013 compared to 37.7% in 2010. ITN use among forest goers has also increased. The percentage of forest goers who slept under an ITN the last time they were in the forest was 48.7% in 2013 compared to 37.1% in 2010, showing that progress has been made but that much more is needed.

By working closely with OD officials, CNM, and MOH, CAP-Malaria has been able to document improved quality of HIS/MIS data in its target areas. Data errors within MOH HIS/MIS system were reduced from 17.4% in the October 2013 to March 2014 period to 2.5% between April and August 2015, as shown in the figure on the right side.



An offline reporting system was set up and introduced to project staff in all target areas in Cambodia and project staff in Thailand, helping to overcome challenges faced when internet access is limited; this system allows project to staff to enter data offline, e-mail the completed file, following which the system automatically uploads the data into the central server. This saves time and effort at all levels.

During project year 4, significant effort was placed by the M&E team on improving the competency of both staff and counterparts in data collection and analysis through regular coaching, mentorship, and supervision. These efforts continue to bear fruit.

In Cambodia, 169 HIS/MIS staff working at PHD/OD and public health facilities in almost all target ODs successfully participated in RDQA coaching and RDQA exercises organized by CAP-Malaria during this period. By the end of the coaching, participants were able to:

- VERIFY rapidly:
    1) The quality of reported data for key indicators at selected sites
    2) The ability of data-management systems to collect, manage and report quality data for project indicators.
- IMPLEMENT corrective measures with action plans for strengthening the data management and reporting system and improving data quality.
- MONITOR capacity improvements and performance of the data management and reporting system to produce quality data.

CAP-Malaria developed a common M&E plan for the three CAP-Malaria countries and submitted this plan to RDMA for final approval in September 2015. All project indicator reference sheets were updated, and revisions were made to most M&E tools.

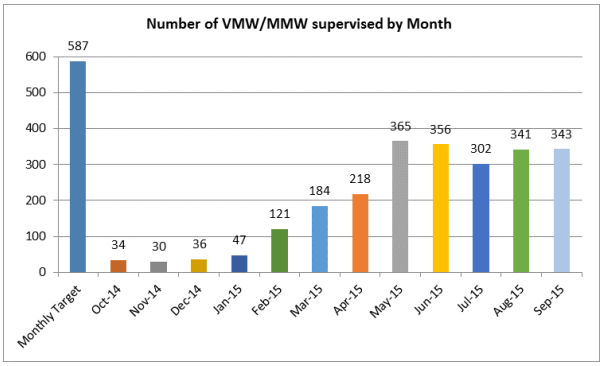
CAP-Malaria provided significant technical assistance (TA) CNM to develop national technical supervision tools. The project also supported CNM to collect strategic information regarding malaria control program management, case management quality, and malaria commodity management, data quality at VMW, HF, and OD/PHD level. These include a national technical supervision tool for HF staff to supervise VMWs, national technical supervision tools for national/PHD staff to supervise referral hospitals (RH) and ODs, and a national technical supervision tool for national/PHD/OD staff to supervise HCs were jointly developed, field tested and introduced nationwide.

CAP-Malaria provided training for government/counterparts and CAP-Malaria staff on how to use new national supervision tools for VMW/MMWs and health facility supervision and these national tools were introduced in CAP-Malaria target areas.

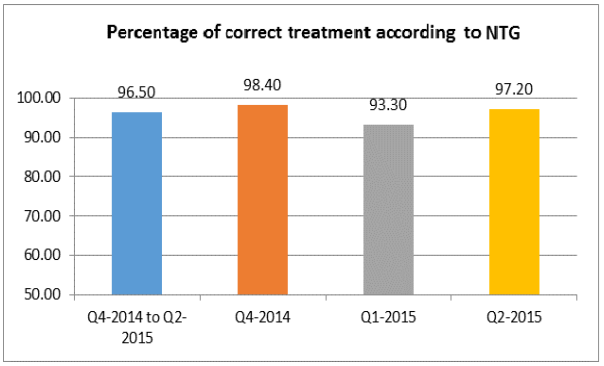
The national malaria tools for OD and RH supervision were just finalized early in October 2015 and training for government/counterparts from CAP-Malaria target ODs will be organized in late October 2015. CAP-Malaria will support government counterparts to conduct supervision to ODs and referral hospitals in target provinces. This is one of the contributions and CAP-Malaria technical M&E inputs provided to the national malaria control program to strengthen malaria technical supervision countrywide. These tools- and their ongoing use- could be one of the legacies of CAP-Malaria.

Supervision from HC/HP to VMW/MMW was conducted on a monthly basis. During this reporting period, 198 out of 597 VMWs were visited monthly. As VMW/MMWs are numerous and it is not logistically possible to supervise each one monthly, only those with poor performance identified during monthly meetings were targeted for the technical supervision visits. In addition, VMWs without recent reported malaria cases were also visited in order to refresh them with malaria case management so that they could maintain their skills to screen and treat malaria case in their village. As the role of VMW/MMW in malaria management is increasingly important, CAP-Malaria has paid more attention to strengthening the quality of malaria management and increasing the number of supervision visits as much as possible. During these last 2 quarters, the number of VMW/MMW visited by HC and CAP-Malaria staff has increased gradually.

In August 2015, a national technical supervision tool for use by HCs with VMW/MMW was jointly developed by CNM and CAP-Malaria. In September 2015, trainings in how to use the national tool were provided to HC staff in charge of supervising VMW/MMW in Samrong OD, Battambang OD, Sampov Loun OD and Sampov Meas OD. This new tool will be applied from October 2015 onward.



Supervision is conducted every quarter from the OD level to health facilities. During this reporting period, 98 of 196 (50%) endemic health facilities within the catchment areas of CAP-Malaria were visited. Supervision visits were planned to all endemic HFs under the project area. However, due to the shortage of OD supervisors, this was not possible. To cope with this limitation, only HCs with poor performance were prioritized for supervision as were providers working at health facilities that haven't had malaria cases for a long period of time to ensure that their skills were maintained by providing a refresher course on malaria case management.



During this reporting period, 3,573 reported malaria

cases were audited and we found that 3,447 (96.5%) of these were correctly treated according to the national malaria treatment guidelines. Patients' age and gender were usually recorded in health facility registers. However, patients' weight and malaria species were not completely recorded.

In the first quarter of 2015, RDTs were found to be out of stock in 2 out of 76 HFs visited and 4 HFs out of 74 experienced ACT stock out.

CAP-Malaria has used strategic information generated by the project team or project evaluation team to improve project planning, implementation and monitoring and evaluation. RIG recommendations have been used and implemented at all levels. For example, filing systems at service delivery points were put in place to facilitate data retrieval. Efforts were made to prevent double counting from happening in all target areas. More staff was recruited to strengthen the CAP-Malaria data management processes, as per the RIG recommendation.

Strategic information on ACT/RDT is used to improve ACT/RDT supply and management at all levels. Based on findings from internal assessments of data quality, CAP-Malaria organized mentoring supervision visits from central level to all target ODs.

CAP-Malaria developed village-based malaria maps showing API distribution in SPL OD in 2013 and updated these in 2014. This map as shown in annex of the report (section 8) has been used by project team to keep special vigilance of malaria cases in certain target areas. This will enable them to better plan project activities accordingly.

CAP-Malaria continued efforts made to monitor and use case management data (number of malaria tests) to improve commodities forecasting and prevent stock outs in target service delivery points. In addition to that, CAP-Malaria made use of new technology to keep track of ACT/RDT stock status using tablet computers at service delivery points.

CAP-Malaria provided technical assistance (TA) to CNM to develop an SOP on malaria outbreak and emergency response. CAP-Malaria drafted the initial version of the SOP and shared it with CNM and stakeholders for comments in consultation with a consultant hired to provide short term technical assistance. The project team actively participated in a consultative meeting organized by CNM to motivate stakeholders to urgently take further steps to be prepared for malaria outbreak and response.

Related to the TA above, the project provided additional support to target ODs including SPM, BTB and RTK PHD to investigate reported spikes in malaria cases by retrieving malaria data from the MIS database, and on confirmation that the number of cases had increased significantly, prepared an emergency response that was carried out in June and July of 2015, resulting in declining numbers of new cases.

A key challenge faced by the project is that during this year, it was difficult to get timely monthly malaria cases reports from all VMWs and this likely results in underreported malaria cases (as well as number of tests and numbers treated) in the existing malaria information system (MIS). Due to factors beyond the control of CAP-Malaria and as reported in the local and international media, VMW monthly meetings have not been held regularly outside CAP-Malaria areas, and monthly malaria case reports have not been made available on a consistent basis. This is particularly true for VMWs who work in the most remote locations. While CAP-Malaria has provided some support for meetings to help mitigate this situation, it remains a concern.

M&E Activities Planned for Next Period:

- Strengthen reporting system through online/offline standard project progress report http://cap-m.org/view_data.php?op=pr&id=700
- Continue tracking data for output and impact indicators
- Continue RDQA & and support external RDQA
- DOT cross-check
- Support OD AOP review/project progress reviews
- Conduct end line household surveys
- Conduct end line migrant surveys
- Conduct end line school-based BCC outcome assessment
- Organize M&E workshop to disseminate and use of strategic information

4. PROGRAM PERFORMANCE AND KEY CHALLENGES ENCOUNTERED

Mobile and migrant population (MMPs): MMPs are hard to reach due to their irregular mobility, especially those moving between non-malaria and malaria endemic areas, including across borders. Independent groups or individuals, particularly forest-goers are even harder to follow. Outdoor biting is really challenging even when LLIN/LLIHNs are provided. Malaria case follow-up is often missed and DOT implementation is unlikely applicable within this group.

Supply chain: Some HFs and VMWs/MMWs experienced shortages of ACT/RDTs and lab reagent materials. CAP-Malaria has to facilitate communication with CNM/CMS to ensure adequate supply of commodities from the central level, as well as locally mobilizing supplies among ODs and HFs to fill critical and urgent gaps. Monitoring showed that a number of ACTs were expired or are potentially expired.

Quality control of malaria diagnosis at HFs: RDT was still used in some HFs despite the availability of a microscope. CAP-Malaria was asked to support the whole package of microscopy QA, including quarterly supervision from the provincial lab supervisor of health facilities, as CNM confirmed the unavailability of funding for this activity. This activity has started and will be continued in the upcoming period to reduce barriers to microscope use.

Technical supervision: OD/PHD supervision and monitoring on malaria activities was irregular due to financial and time constraints. CAP-Malaria is partially filling the gap although funding is expected from the Global Fund; however, it is unclear when this will materialize. This is particularly true for supervision on malaria microscopy QA/QC.

Multi-sectorial collaboration: The Provincial Special Working Groups for Malaria Elimination in a number of provinces were not as active as expected. **Cross-border collaboration** requires huge effort from CAP-Malaria both at the central and at lower levels. For **Private providers (PPs)**, the extent and quality of malaria case management by non-registered PPs is unknown since they are not included in the PPM scheme and they have not been supervised and monitored. Law enforcement may be required and CAP-Malaria may need to advocate for this.

NTGs: NTG 2014 is not fully implemented yet due to delay of A+M FDC arrival, thus the targets ODs where DHA-PIP resistance was detected and need to be replaced by A+M co-formulated (FDC); is still pending. During the last project year, we anticipate A+M FDC is used at tier 1 areas.

Malaria pre-elimination/elimination is challenging with regard to technical, operational, and financial aspects. CAP-Malaria requires more support from all stakeholders. A basic essential package for malaria pre-elimination activities was defined for the remaining life of the project and a work plan, budget, and SOP have been developed are being applied.

5. WAYS FORWARDS IN YEAR 5 (OCTOBER 2015-SEPTEMBER 2016):

- Following exit strategic plan, phasing out activities in 6 ODs (MRS, PLN, PPT, SNK, SMR & BLN)
- Strengthening normal control activities emphasizing on prevention and effective EDAT in 5 ODs (SPM, BTB, SPL, SRG & STT)
- Continuing implementation of the basic essential package for malaria elimination in SPL OD emphasizing on 1, 3, 7 strategic approach
- Regarding M&E, strengthening the team and rigorously monitoring new and existing field staff to ensure better data collection, entry, and analysis using a standard approach with all CAP-Malaria staff using the on-line system. Provide coaching as necessary.
- Generating strategic information from the project activities/interventions, organizing progress review workshops and results dissemination to stakeholders
- Documentation of the project's lessons learned, both on control and prevention, and eventually on pre-elimination.
- Develop project closed out work plan and follow it accordingly

6. SUCCESS STORIES/LESSONS LEARNED

Title: Effective Case Management by Village Malaria Workers Leads to Decline in Malaria Deaths

* Key Issues**:** The important role of VMWs in malaria control and prevention

Summary: In the last 15 years, malaria caused over thousand deaths in Cambodia, 1,020 death cases in 1990 (world malaria report). The deaths mostly occurred in remote endemic villages where people are isolated from health services. Poor road infrastructure impedes timely access to malaria services on time, so many malaria patients die unnecessarily due to late treatment-seeking. Although the number of cases reported has increased, this is due to increased testing and a notable increase in population. Since introducing services through VMWs in 2008, there has not been one single malaria death in the village, whereas in prior areas, deaths were not uncommon.

Tonob Chhoeng village is covered by Pha Av Health Center, Trapaing Prasart District, Oddar Meanchey Province. The village is located close to the Thai border. It is surrounded by mountains and thick forest, and most residents earn their livings through forest-related activities, putting them at high malaria risk. Malaria cases in this village are consistently higher than those in other villages. In 2014, 347 suspected cases were tested of which 218 (63%) were confirmed positive.

Mr. Duong Chanthol is husband to Ms. Pheom Somphors, whose family moved from Takeo Province to live in Tonob Chhoeng village in 2007. On arrival, they found that many of their neighbors and friends have had malaria (10 per month, on average) and that some of these people died.

In the words of Mr Duong: "*When I first arrived, many people- including me-got malaria. We faced an extremely difficult situation because there were no malaria services in the village. It was so hard to reach the health center due to terrible road conditions. To get malaria services, we had to leave home at 6:00 am, and would arrive back at 10:00 pm. Sometimes, we spent the night on the way when there was rain. I think this was one of the reasons that a few of my neighbors died from malaria."*

In order to reduce malaria morbidity and mortality and to increase access to malaria services, village-based VMWs were established at the community level. In addition to providing testing and treatment services, VMWs play a vital role to raise malaria awareness and use health education and interpersonal communication to encourage community members to seek prompt testing and treatment should they have malaria symptoms.

In 2008, Mr. Duong Chanthol and Ms. Pheom Somphors were selected and trained to be VMWs by the USAID-funded Malaria Control in Cambodia (MCC) project. They were equipped by the project implementer (URC) with malaria rapid diagnostic tests (RDTs) to test suspected cases of malaria, treat uncomplicated cases and refer severe malaria, pregnant women and children under 5 years, as soon as possible (preferably within 24 hours of onset of fever) to public health facilities. Following the end of the MCC project, the follow- on CAP-Malaria project continued working with VMWs, providing additional skills building and linking them with the public health system for improved service provision and monitoring of cases.

Since VMWs were introduced in the village, the number of suspected malaria cases tested and confirmed increased, facilitating prompt treatment. Since 2013, there has been a significant increase of population in the village, with the number of households growing from 50 to 500 between 2007 and 2015 as people have cleared land in the forest and settled there for economic reasons, usually to earn income from forest-related activities. Because the area is highly endemic for malaria (being inside the forest), malaria risk is increased. Because we have more VMWs and a higher population, more cases have been detected. These factors combined resulted in VMMs now detecting between 20 and 30 cases monthly. Severe cases are referred by VMWs to the nearest health center. With VMWs taking active roles in managing malaria, there has been not been a single malaria-related death in Tonob Chhoeng village since 2008.

Again, in the words of Mr. Duong: ***Having trained VMWs in a village appears to be a key factor contributing to reduce malaria deaths since VMWs are able to provide early diagnosis and treatment and refer severe cases HC on time. I would like to thank CAP-Malaria for continuing to build my capacity and providing other support which motivates me to be on my position and help my villagers.***

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Mr Duong Chanthol and Ms Pheom Somphors attended training supported by CAP-Malaria, 2015 in Along Veng. Photo: Heang Chantha

Mr Duong Chanthol performs blood test using RDT for suspected malaria patient in October 2015. Photo: Uorng Saroeun

7. PROJECT CATALOG OF BCC MATERIALS DEVELOPED DURING PROJECT LIFE

No	Product	Description
1		**Type of BCC material:** Signboard **Objective :** To warn villagers who are in identified hotspots about malaria transmission **Key message:** Malaria transmission is occurring in this village, always sleep under an LLIN **Target audience:** Residents and mobile/migrant populations in the village **Number produced:** 60 units **Where distributed :** Hotspots in Sampov Loun OD (Pre-elimination area)
2		**Type of BCC material:** Flipchart (Job Aid) **Objective :** Used by service providers in malaria education sessions **Key messages:** - Malaria is caused by mosquito bits - Sleeping under LLIN/LLIHN prevents malaria - Malaria signs/symptoms (chills, fever, sweating and headache) - Seek malaria treatment with VMW/HC staff if you suspect malaria - By following provider prescription exactly, your malaria will be cured **Target audience:** secondary audiences including service providers (VMWs, HF staff private providers) and school teachers **Number produced:** 2,300 flipcharts **Where distributed :** project target areas

No	Product	Description
3		**Type of BCC material:** Poster **Objective :** To promote consistent LLIN use **Key message:** Sleeping under LLINs consistently at home or in the forest prevents you from getting malaria **Target audience:** at-risk residents **Number produced:** 15,000 units **Where distributed:** project target areas
4		**Type of BCC material: Poster** **Objective :** To promote consistent LLIN use **Key message:** Sleeping under LLIN consistently can prevent malaria and save you a lot of money since you will miss fewer work days **Target audience:** mobile/migrant population **Number of production:** 15,000 units **Where distributed:** project target areas
5		**Type of BCC material:** Poster **Objective :** To promote correct and early care seeking behavior **Key message: If you suspect malaria,** treating malaria with VMWs or HF staff will help ensure you are cured and will save money for your family **Target audience:** at-risk residents and mobile/migrant populations **Number of production:** 10,000 units **Where distributed :** project target areas
6		**Type of BCC material:** Poster **Objective :** To promote LLIN use among pregnant women **Key message:** Pregnant women has to sleep under an LLIN routinely to prevent malaria in mother and unborn baby **Target audience:** pregnant women living in endemic areas **Number of production:** 11,000 units

No	Product	Description
		Where distributed : project target areas
7		**Type of BCC material:** Poster **Objective :** To promote correct use and care LLIN **Key message: How to** properly care for LLIN **Target audience:** at-risk residents and mobile/migrant populations **Number of production:** 29,000 units **Where distributed :** project target areas
8		**Type of BCC material:** Poster **Objective :** To promote malaria hotline phone numbers **Key message: If you have any** questions about malaria, please call the following numbers **Target audience:** at-risk residents, mobile/migrant population and service providers **Number of production:** 3,000 units **Where distributed :** Pursat, Battambang, Sampov Loun and Oddar Meanchey
9		**Type of BCC material: leaflet** **Objective:** To promote malaria awareness among mobile/migrant populations, describe risk factors, prevention and treatment methods. **Key messages:** - Mobile/migrant population is high risk in getting malaria - Malaria is caused by mosquito bites - Malaria signs/symptoms (chill, fever, sweating and headache) - Why MMPs are at high risk - Sleeping under LLIN/LLIHN prevents malaria - Immediately seek malaria treatment from VMW/HC staff if you suspect malaria **Target audience:** mobile/migrant population

No	Product	Description
		Number of production: 70,000 units **Where distributed :** project target areas
10		**Type of BCC material:** Sun visor **Objective :** Stick on the taxi to promote malaria awareness among mobile/migrant passengers **Key messages:** - Malaria is caused by mosquito bites - Sleeping under LLIN/LLIHN prevents malaria - Immediately seek malaria treatment from VMW/HC staff if you suspect malaria **Target audience:** mobile/migrant population **Number of production:** 1,600 sheets **Where distributed :** Pursat and Battambang

8. ANNEXES

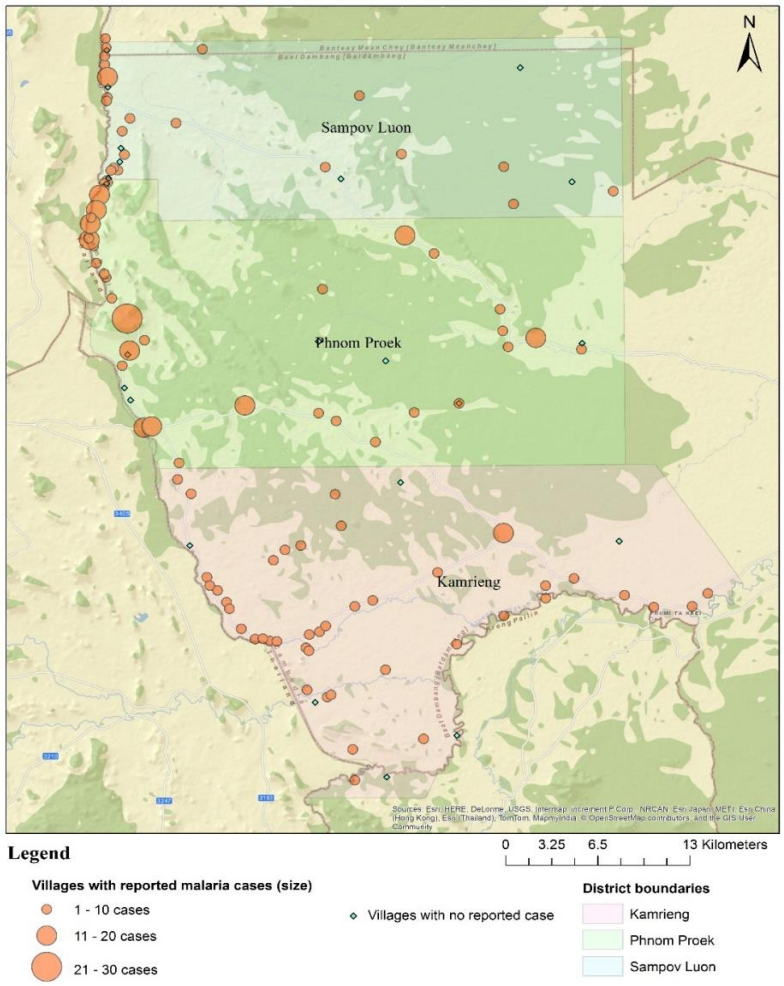
8.1 Project performance indicators (October 2014-September 2015)

Indicator Oct14-Sep15 -6-11-1

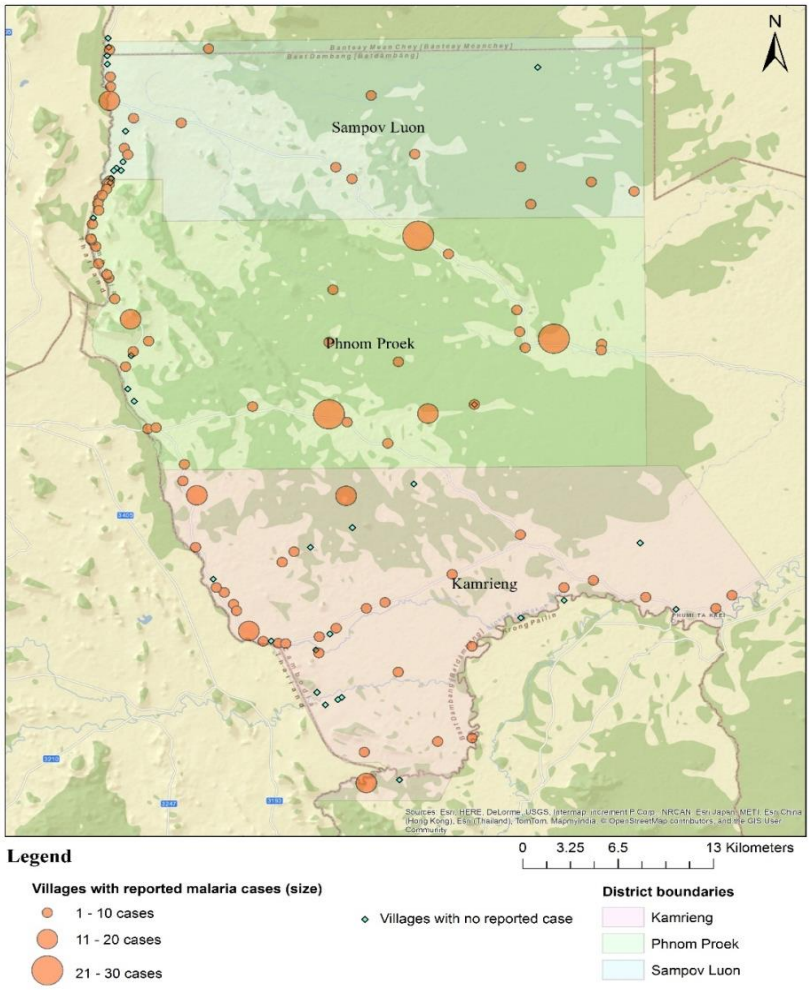
8.2 Mapping malaria case and village in SPL OD

Map 1: Villages with Reported Malaria Cases in Sampov Loun OD

2013

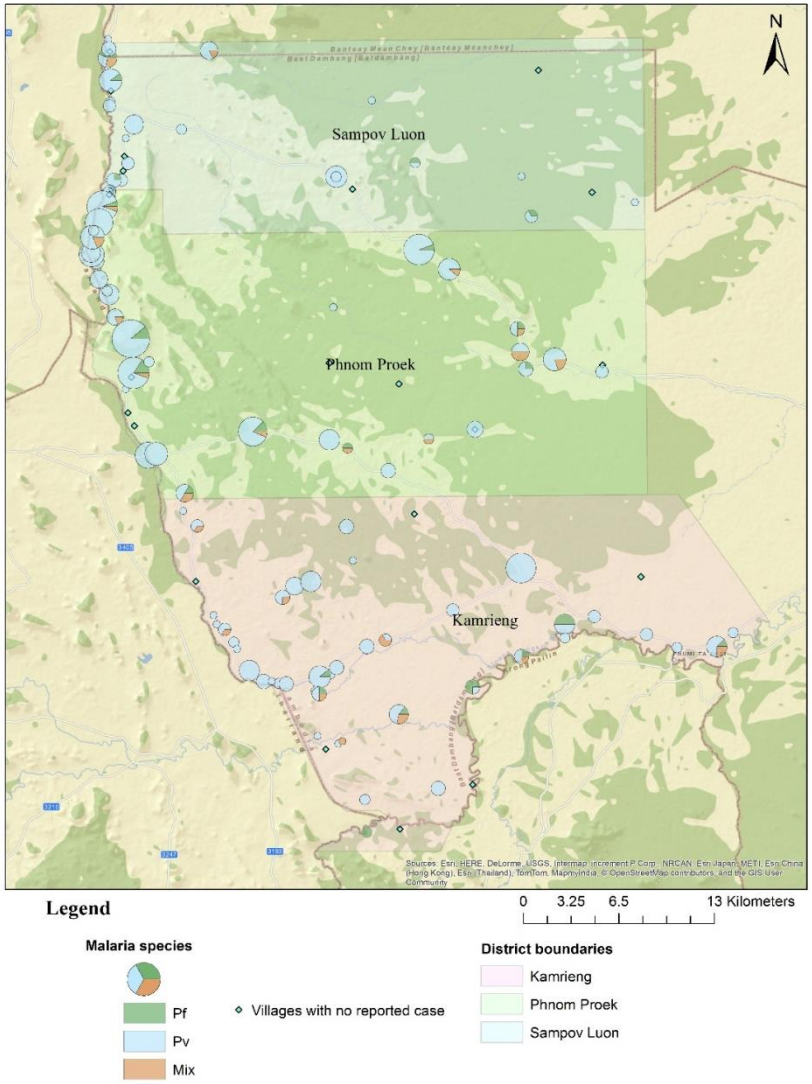


2014

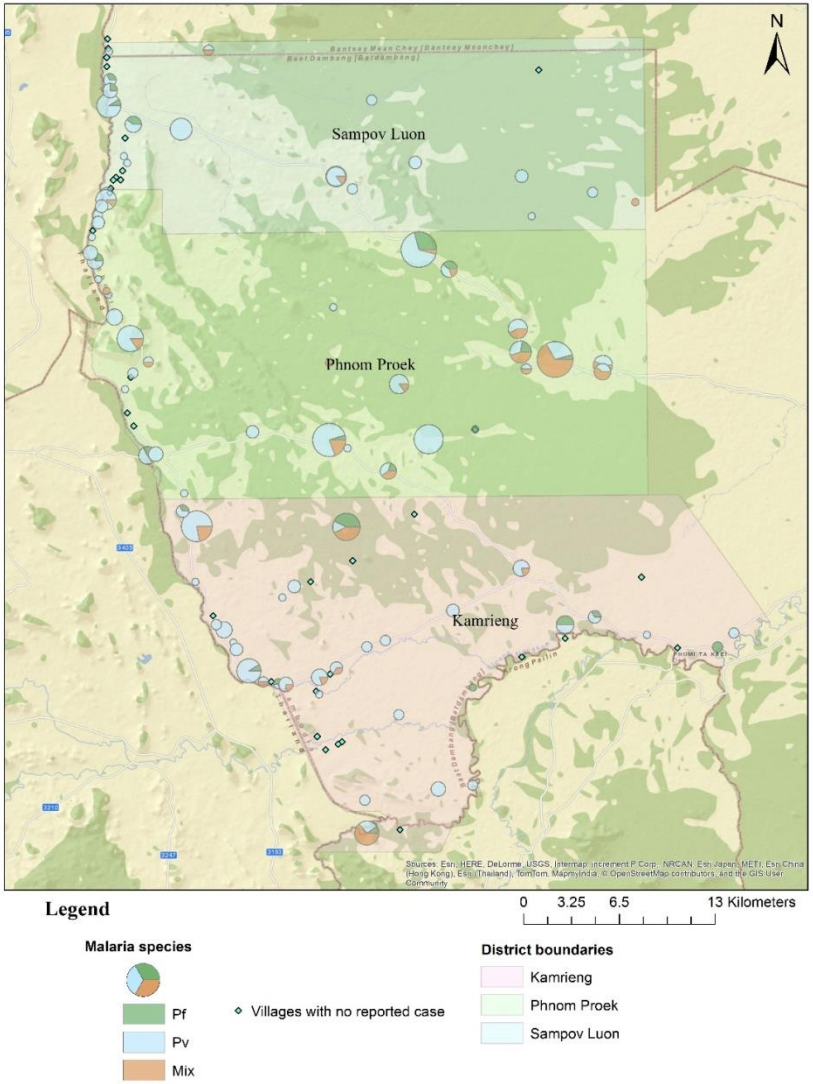


Map 2: Confirmed case by *P* species in Sampov Loun OD

2013

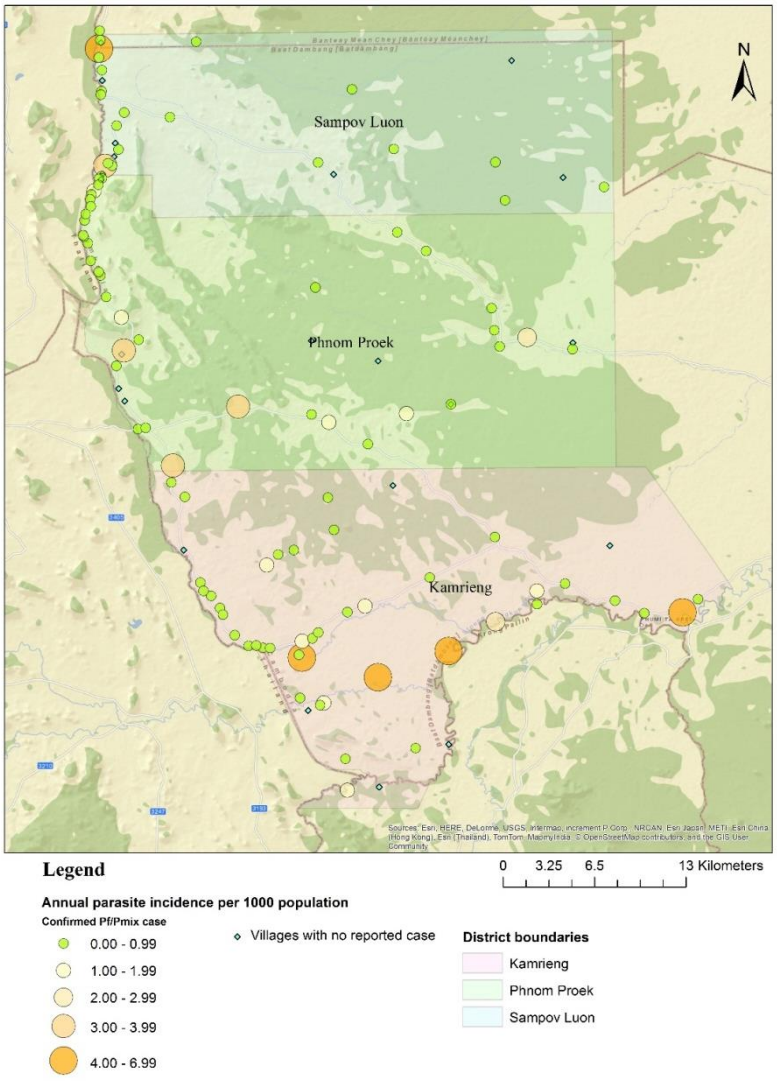


2014



Map 3: *Pf/Pmix* Annual Parasite Incidence by Village in Sampov Loun OD

2013



2014